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AUTHOR Blandy, Richard; Dockery, Michael; Hawke, Anne; Webster, Elizabeth

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ABSTRACT

A study was conducted to obtain pilot evidence that could serve as a basis for developing convincing methods for individual Australian companies to use in determining their returns from investment in training. The study attempted to replicate survey results from significant overseas surveys by using information collected on more than 90 Australian firms. The following 3 research designs were tested: 2 pilot studies that each examined 40 Australian firms; a "matched-pairs" study involving 12 firms; and in-depth case studies of 3 firms that undertake significant amounts of training. The following were among the main outcomes and findings: (1) Australian firms provide extensive training for their incoming employees; (2) Australian workers pay more for their training than U.S. workers do, because of lower starting salaries; (3) Australian employers gain only about two-thirds of the productivity increases from training that U.S. employers gain, but the training is probably as profitable to Australian as to U.S. firms; (4) hours of training provided by Australian firms are directly related to product-market uncertainty and unpredictability; and (5) firms' profitability is directly related to the quantity and quality of training provided. It was concluded that, to be truly convincing, the pilot surveys and case studies undertaken would need to be replicated with significantly larger samples. (Twenty-five tables/figures are included. The bibliography lists 19 references.) (MN)

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Richard Blandy

Michael Dockery

Anne Hawke

Elizabeth Webster

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evidence from Australian enterprises

Richard Blandy
Michael Dockery
Anne Hawke
Elizabeth Webster

NCVER

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We would like to thank Mark Harris (University of Melbourne) for assisting us with econometric analysis, John Bishop (Cornell University) for sending us his (at that time unpublished) wonderful literature review of on-the-job training, Jack Barron (Purdue University) for sending us copies of the USA Employment Opportunity Pilot Project (EOPP) survey and Michael West (University of Sheffield) for sending us copies of the United Kingdom Centre for Economic Performance (CEP) survey.

We wish to acknowledge the co-operation of a large number of firms who agreed to provide us with data in interviews and case studies sometimes lasting hours (and even days). For reasons of confidentiality, these firms (and the many people who helped us who were employed by them) cannot be identified; but that circumstance does not lessen the contribution that they have made to what we hope will be a study that progresses national understanding of Australian firms' investments in training. We would like to thank the case study firms, in particular, for providing us with comments on earlier drafts of the case studies.

We wish to thank the anonymous reviewer of the final draft of the study for his or her extensive comments and advice. While we have not accepted all of that advice, for a range of reasons, the study has benefited from the quality of the reviewer's contribution.

Finally, we would like to thank Hugh Guthrie, Andy Smith and Jennifer Gibb of NCVER, who oversaw the conduct of the study, Kaye McAdam of NCVER, who oversaw the production of this report, Nena Bierbaum, who helped with the editing process, and Trevor Redhead of the Northern Territory University, who managed the formal administration of the project on behalf of Flinders University, the Northern Territory University and AustralAsia*Economics Pty Ltd.

preface

This study was undertaken by a team of university researchers under the aegis of AustralAsia*Economics Pty Ltd acting on behalf of a joint venture of Flinders University and the Northern Territory University. The universities to which the authors are attached are Curtin University of Technology, Flinders University, the Northern Territory University, the University of Melbourne and the University of South Australia.

The research was financially supported by a 1998 National Research and Evaluation Committee (NREC) contract administered by the National Centre for Vocational Education Research (NCVER). We are appreciative of the opportunity afforded to us by NREC and NCVER.

A presentation of preliminary findings from the study was given at a seminar in Adelaide organised by NCVER on 3 September, 1999 at which four NREC studies addressing the question of 'the return to an enterprise from an investment in training' were discussed. We would like to thank the participants at that seminar for their comments and suggestions.

A version of an interim report to NCVER was presented at Griffith University's Centre for Learning and Work Research's 7th Annual International Conference on Post-Compulsory Education and Training in Surfers Paradise on 8 December 1999. We would like to thank the organisers of the conference, as well as the participants, for their suggestions and ideas.

One of the authors of this book, Anne Hawke, died tragically of a cerebral thrombosis on 30 August 2000. She was 33 years old. The remaining authors have been deeply saddened by Anne's death.

executive summary

introduction

This study has been undertaken by a team from five universities, on behalf of a Joint Venture between Flinders University, Northern Territory University and AustralAsia*Economics Pty Ltd. The study was approved by NREC in October 1998 and was completed in June 2000. NCVER supervised the conduct of the study.

A review of recent overseas studies in the United States of America, United Kingdom and Europe clearly indicates that human resource management (HRM) practices, taken together, are far and away the most powerful predictor of improvements in companies' productivity and profitability (OTFE 1998). Company commitment to the skill and training of its employees is a dominating aspect of a company's HRM practices.

The principal objective of the study was to provide *pilot* evidence in Australia on means by which convincing methods could be developed through which individual companies *could assess for themselves* whether it would pay them to shift from being 'low-training' companies to 'high-training' companies.

In fact, during the course of its evolution, the focus of the study shifted towards collecting pilot data to *test* a number of research designs that *could* form the basis for collecting the data needed to measure and assess the productivity and profitability payoff to enterprise training in the Australian context.

To achieve this goal, the study attempted to replicate survey results from significant overseas surveys using information collected on more than 90 firms in Australia, and undertaking a small number of in-depth case studies.

testing the research designs

The research designs chosen were:

- a large employer survey undertaken for the USA Employment Opportunity Pilot Project (EOPP) by the National Institute of Education and the National Centre for Research in Vocational Education that looked at the effects on the productivity and profitability of firms from training newly recruited employees

  In our Australian pilot survey, 40 firms, evenly distributed between Perth, Darwin, Adelaide and Melbourne, were included in the study using this framework.

- a large employer survey undertaken by the United Kingdom Centre for Economic Performance (CEP) at the London School of Economics that looked at the effects on profitability of firms from the quantity and quality of training that they provide

  In our Australian pilot survey, 40 firms, again evenly distributed between Perth, Darwin, Adelaide and Melbourne, were included in the study using this framework.

- the well-known study of 'matched plants' undertaken at the United Kingdom National Institute of Economic and Social Research (NIESR) involving examination of productivity differences between German, French and British plants, that looked in particular at the effects of differences in training on the differences in productivity

  Twelve firms, again evenly distributed between Perth, Melbourne and Darwin/Adelaide were planned to be involved using this framework.

- in-depth case studies of three Australian firms (from Darwin, Adelaide and Melbourne) that undertake a good deal of training, and that believe that training pays, that looked at whether those beliefs can be sustained by the firms' own data

the EOPP and CEP surveys

The survey instruments used in the EOPP and CEP surveys were shortened and modified to reflect Australian terminology. The respondents were readily able to answer the questions, so far as we could judge.

NIESR-style matched-plants studies

Two semi-structured interview instruments were developed as a basis for undertaking six 'matched plants' studies of hotels and six 'matched plants' studies of kitchen cabinet manufacturers, based on the published output of NIESR on these two groups of businesses.

The semi-structured interview instrument for three-star hotels worked well in Darwin, Melbourne and Perth, but only five hotels could be recruited to take part. Because of hotel recruitment difficulties also, a five-star and a four-star hotel had to be included as part of the sample.

In the kitchen cabinet studies, only two firms (both in the same city) could be found, notwithstanding very substantial efforts in the other cities to identify another four companies willing to participate.

in-depth case studies

A study by the (Victorian) Office of Training and Further Education (OTFE), *Return on training investment: Development of enterprise frameworks* (1997) was used as a framework for discussions with three companies. This framework proved useful as a methodological framework, but also proved quite bracing for the companies, in a data-requirement sense.

outcomes and findings from the research designs

Here, we reproduce the main findings that have emerged from the approaches taken to exploring the issue of enterprise returns to an investment in training in the Australian context:

1. Australian firms provide extensive training for their incoming employees. About half of the time of incoming employees is taken up with training over the first three months of their employment, compared with about a third of the time of incoming employees in USA firms. The main sources of this difference are the greater hours spent in Australia on formal training off the job and on informal training provided on the job by co-workers.
2. This result is associated with Australian workers paying more for their training (through accepting lower starting wages) than happens in the USA, and with employers gaining productivity increases from this training (not offset by employees' wage increases) of about two-thirds of those in the USA. In fact, nearly all the productivity gains from incoming employees' training were captured by firms in Australia compared with about half of the productivity gains in the USA. The combination of these two factors means that employer-sponsored training is probably about as profitable to Australian firms as it is to USA firms.
3. Prior education and training *increases* the likelihood, in Australia, that an employee will receive further training opportunities, but reduces the number of *extra* hours that an employee actually spends on further training. This implies that Australian firms are at least somewhat effective in their selection processes in matching trainable people to jobs requiring training.
4. Hours (quantity) of training provided by Australian firms are directly related to product-market uncertainty and unpredictability, and to other forms of capital investment in innovation, physical capital and R&D. Quantity of training is also inversely related to

involuntary labour turnover. Types (quality) of training given by Australian firms are directly related to the presence of internal labour markets in firms, as well as to other forms of capital investment by firms and competitive product market conditions.

5. The profitability of firms is directly related to the quantity and quality of training provided by them and is also reflected in firms' paying above market wage rates and in difficulties in their finding suitable employees.
6. The results reported in the two preceding paragraphs appear to be largely consistent with British results also using the CEP survey instrument.
7. By contrast, preliminary results from the study of matched hotels, unlike results from the work of Prais on matched hotels at the NIESR in Britain, reveal little influence of training practices or vocational education and training (VET) qualifications on productivity levels in the hotels studied. Commitment to training in the majority of hotels studied is poor, and reactive rather than proactive. However, these results may be confounded by an inability to maintain a constant star rating across the sample of hotels investigated.
8. The preliminary review of the experiences revealed by case studies of three firms shows that enterprise returns to training can be exceptionally high, especially for training that is highly specific, rapidly accomplished, and related to the introduction of new technology or working patterns. Such training pays a firm, even if labour turnover is high.
   - For example, Company X has a labour-intensive production process. A formal induction period of five days is offered to all production line workers. The employee's chances of getting a productivity bonus each month turns out to be directly related to his or her average training test score. The only other variable that has a consistent and significant effect on the chances of getting a productivity bonus is the length of time on the job, which suggests that learning by doing is an important source of work skills and productivity.
   - Company Y introduced a new production technology involving the adaptation of high-angle rescue equipment for a tree lopping and trimming activity. The training occupied one day. It paid for itself in a fortnight. The rate of return to the company on its investment in training exceeds 500 per cent per annum.
   - Company Z changed its work culture in a particular department through an intensive training activity involving all of the staff in the department over a series of weekends. The results have been a 25 per cent increase in productivity, and a rate of return to the company on its investment in training again in excess of 500 per cent per annum.
9. Informal learning and training methods, on and off the job, were regarded by many of the businesses as generally superior to formal classroom training because *real* knowledge was learned in the former, while the latter was too often mostly about obtaining paper qualifications. Further, some of the most important skills from businesses' point of view were communication skills, team-working skills and leadership skills—not just task-oriented motor skills.

conclusions

The overall results emerging from the various approaches tried in the course of this study are suggestive of a positive impact from investments in training by enterprises on their productivity and profitability.

Nevertheless, to be truly convincing, the pilot surveys and case studies undertaken in this study would need to be replicated with significantly larger samples, if the conclusions were to be based on a sound statistical footing. The conclusions are important, in a policy sense, particularly in the context of the debate that has recently emerged about reasons for the weakness of the Australian dollar relative to the USA dollar.

It is important to note, in this respect, that the Australian Bureau of Statistics (ABS) is planning to drop its training expenditure and training practices surveys. In other words, data that presently are being collected that could have been augmented to enable the assessment of the productivity and profitability investments in training by enterprises are no longer going to be.

Official data collection about training at the enterprise level is about to become worse, not better.

We would strongly recommend that the Commonwealth Government:

- either reverse this decision and reinstate these surveys, amended on the basis of the EOPP and CEP surveys trialled in this study, or, that it
- fund a new large-scale enterprise level training survey, based on the EOPP and CEP surveys trialled in this study, preferably in a longitudinal data context, perhaps attached to the present Business Longitudinal Survey, to provide a solid quantitative basis for assessing the returns to training by enterprises in the Australian context. Such information is crucial to providing a proper basis for considering policy towards enterprise level training.

We would also strongly recommend that case studies continue to be undertaken by NCVER and other training research bodies using the framework developed by OTFE (1997) to provide a steadily increasing body of evidence on the productivity and profitability of individual firms' training experiences.

introduction

returns to the firm on an investment in training

Training expenditures are a unique form of business expense. Unlike other expenses, training costs represents an investment by the firm in their employees. As with any other investment, a commitment to training is directly related to the expected returns from each dollar invested.

Assessing the value of these returns has been the subject of a large body of national and international research. Almost unanimously, studies have concluded that enterprises are interested in training as a means of securing improved workplace performance and greater profitability (OTFE 1998; Billett & Cooper 1998; Baker & Wooden 1995).

The logical, measurement and statistical problems in producing compelling evidence of the effect of training on firms' productivity and profitability should not be underestimated, however. The returns emerge after the investment has been undertaken requiring a longitudinal focus to collecting the data needed for correct measurements to emerge. The costs and returns to training are often shared between the firms and their employees, increasing the data requirements for correctly identifying each party's share. The costs and returns to the firm often occur through changes in productivity that are difficult to measure and difficult to attribute accurately to the various factors that normally have played some role simultaneously, training being just one cause. It is useful to embed the collection of training data in the context of data collected about firm's activities generally, therefore, rather than as an isolated activity. The methodologies used in the present study, for example, attempt to address these problems, which is why they are attractive as approaches to understanding the productivity and profitability effects of enterprises' training activities.

An earlier study by Carnevale and Schulz (1990) came up with the very similar findings that training typically benefits firms through:

- increased revenue and lower unit costs resulting from increased productivity of capital and labour
- reduced expenses resulting from less wasted time and materials, less absenteeism and fewer accidents
- difficult to measure improvements in productive culture, such as greater employee flexibility and improved employee morale

Measuring these benefits, and relating them to the costs of training in a way that reveals the rate of return on a firm's training outlay (investment in training), is not yet widespread among Australian companies. Many firms may not be aware of the significant increase in their bottom line that could occur if they were to identify and pursue the highly profitable training opportunities that often exist within their own enterprises. As the burgeoning young internet and computer software companies increasingly show, in the future firms are often largely going to be worth simply what their employees can *do*.

OTFE (1997) has produced a handbook that is useful for any enterprise interested in assessing the returns it is getting from its training for comparison against the returns it is getting from other investments. The National Research Evaluation Committee (NREC) has funded four studies through the National Centre for Vocational Education Research (NCVER), of which this study is one, that are endeavouring to develop methods for assessing returns to training for businesses (and the factors that govern these returns).

The following two points are examples from the present study of the sort of returns that enterprises can get from training activities:

- A training project introduced a new production technology involving the adaptation of high-angle rescue equipment for a tree lopping and trimming activity. The rate of return to the company on its investment in training exceeds 500 per cent per annum.
- A training project changed the work culture in a particular department of a company. The results have been a 25 per cent increase in productivity, and a rate of return to the company on its investment in training again in excess of 500 per cent per annum.

Clearly, these company returns will be reduced if employee turnover is high. Hence, firms reaping high rewards from training their employees also have human resources management (HRM) policies that cut turnover to low levels. Research on British businesses by the Centre for Economic Performance (CEP) at the London School of Economics (1997) shows that HRM policies have eight times more impact on company productivity and profitability than business strategy does. Earlier research on enterprise data from the USA Employment Opportunity Pilot Project (EOPP) (Barron, Black & Loewenstein 1989) shows that firms share the gains to training that the firms have financed about 50/50 with their employees, who get higher pay and better conditions and exhibit lower turnover.

The message that HRM policies are what matter if training is to pay is supported by Australian research by Smith (1993). Smith argues that the main factors associated with training programs that yield high returns to an enterprise include:

- strategic planning of the training program within the enterprise
- a co-operative industrial relations climate within the enterprise
- flexible human resources policies within the enterprise
- supportive technology and work organisation within the enterprise

Misko (1996) also identifies HRM factors as being those that influence the returns gained by an enterprise from its training. The factors she identifies as important are:

- the extent to which the skills learned can be transferred to the job
- the quality of on-the-job supervision of the people who have been trained
- the extent of positive reinforcement of post-training improved performance

Some of the issues have yet to be addressed by researchers:

- Do different enterprises adopt different training strategies as a result of differences in commitment to training or other factors?
- What are the long-run consequences of enterprise-specific training?
- How can the costs of training most appropriately be shared by enterprises employing skilled employees? In particular, what is the most effective strategy to facilitate an increase in training investment by small business?

the research designs tested in the present study

The study attempted to replicate survey results from significant overseas surveys using information collected on more than 90 firms in Australia and undertaking a small number of in-depth case studies.

First, we successfully negotiated access to the survey instruments used in the United Kingdom CEP survey and in the USA EOPP survey. These survey instruments were shortened and modified to reflect Australian terminology. The revised survey instruments were successfully used, in the sense that respondents were able to answer the questions readily easily, so far as one could judge, in pilot surveys in four capital cities. Forty firms were involved in each survey. Analysis of the data from these surveys has yielded quite promising results.

Second, two semi-structured interview instruments were developed as a basis for undertaking the matched-plants studies that we had proposed, based on the published output of the United Kingdom National Institute of Economic and Social Research (NIESR). The semi-structured interview instrument for the three-star hotels study worked well in Darwin,

Melbourne and Perth, although only one hotel could be found to participate in Perth. Also, a five-star and a four-star hotel had to be included because we could not recruit more than three three-star hotels. Analysis of these data has not been supportive of the hypothesis that more training is associated with higher productivity. A major problem was that none of the hotels appeared to train very much.

In the kitchen cabinet studies, only two firms (in one capital city) could be recruited to the study, notwithstanding immense efforts in the other cities to identify another four companies willing to participate. Analysis of these data provides understandably inconclusive results.

Third, the (Victorian) OTFE (1997) study, *Return on training investment: Development of enterprise frameworks*, was used as a framework for discussions with three companies selected as in-depth case studies. In these discussions, attention was focussed especially on Techniques E and F in OTFE's study—'Quantitative Analysis' and 'Strategic Evaluation', respectively. This framework proved useful as a methodological framework, but also proved quite bracing for the companies, in a data-requirement sense.

Finally, data from the Australian Bureau of Statistics' (ABS) *Surveys of education and training experience* (1989, 1993 and 1998) were analysed to provide background and backup estimates to the other findings.

ABS-based estimates and the pilot EOPP survey

background—measuring on-the-job training in Australia

Information from the ABS's *Survey of education and training experience* (1989, 1993 and 1997) shows that in the 12 months prior to each survey, 79 per cent, 86 per cent and 80 per cent of persons (in each year, respectively) who were wage or salary earners undertook some form of training (see table 1). For each of these years, on-the job training was easily the most commonly reported form of training undertaken. Although the incidence of on-the-job training appears to fluctuate somewhat, around three-quarters of all wage and salary earners can be expected to have experienced some form of on-the-job training during any 12-month period.

On-the-job training is said to occur (according to the ABS) when an individual participates in a workplace training activity to improve their job skills, while working in some job or other. The types of activities regarded as workplace training activities include asking questions of co-workers or colleagues, teaching yourself, being shown how to do your job, watching others work and other activities. On-the-job training (see last row in table 1) excludes any training that occurred as part of an in-house or external training course, or study for an educational qualification. Clearly, on-the-job training is the most prevalent form of workplace training.

table 1: categories of training undertaken in the previous 12 months

	per cent		
	1989	*1993*	*1997*
some training undertaken	79.0	85.8	80.2
study or training courses undertaken	47.8	47.0	53.5
studied in the previous calendar year	16.8	18.6	15.8
in-house training course	34.9	31.3	33.0
external training course (total)	9.8	11.8	20.0
external, employer supported	6.4	7.3	11.7
on-the-job training	71.8	81.8	71.6

notes: a Multi-response categories collected. Components may not add to totals

b For each survey, data refers to training during the 12 months prior to the relevant survey period

source: ABS (1989, 1993 and 1998)

This is not to suggest that the incidence of on-the-job training is shared equally across all workers. As shown in table 2, there exist a number of differences in the incidence of on-the-job training by various employment characteristics including industry, occupation, sector of employment, size of business and type of employment.

Further, as shown in table 3, demographic characteristics appear to be associated with less variation in the incidence of on-the-job training than is found for employment characteristics. Only the age of the employee and level of educational attainment appear to be associated with statistically significant differences in the incidence of on-the-job training.

The aggregate evidence from the ABS's *Survey of education and training experience* (*SETE*) surveys suggests, therefore, that to understand the extent and importance of on-the-job training, focussing on the characteristics of the business in which an employee works is an

appropriate first step of the analysis. This is the focus that the various elements of this study have, fortuitously as it turns out, adopted.

table 2: employment characteristics associated with the incidence of on-the-job training, Australia, 1997

employment characteristic	wage and salary earners	on-the-job training
	'000	*per cent*
industry		
agriculture, forestry, fishing and hunting	188.4	58.0
mining	95.8	72.8
manufacturing	1184.9	67.5
electricity, gas and water	64.9	80.0
construction	357.8	67.9
wholesale and retail trade	1585.8	65.3
transport and storage	361.7	63.7
communication	137.5	78.4
finance, property and business services	867.3	79.1
public administration and defence	444.5	77.7
community services	1712.3	80.7
recreation, personal and other services	699.8	65.0
occupation		
managers and administrators	530.1	81.7
professionals	1101.1	90.1
para-professionals	531.2	84.8
tradespersons	950.9	70.6
clerks	1287.3	76.2
salespersons and personal service workers	1450.5	66.4
plant and machine operators and drivers	544.7	55.5
labourers and related workers	1301.8	55.4
sector of employer		
public	1767.9	81.1
private	5846.0	68.9
not known	86.7	63.3
size of business		
under 10	1375.5	64.6
10–19	615.1	67.3
20–99	1084.0	72.2
100 and over	3921.9	76.4
not known	704.1	61.9
employment status		
full-time	5255.2	75.9
part-time	2445.5	62.5
permanent	5484.8	76.1
casual	2215.8	60.6

source: ABS (1998), table 1.4

table 3: demographic characteristics associated with the incidence of on-the-job training, Australia, 1997

demographic characteristics	wage and salary earners	on-the-job training
	'000s	*per cent*
age of employee		
15–19	731.0	54.5
20–24	1095.2	84.5
25–34	2076.8	77.1
35–44	1857.8	73.5
45–54	1417.8	66.3
55–64	522.1	54.8
state of usual residence		
New South Wales	2559.5	70.7
Victoria	1941.7	68.6
Queensland	1413.0	73.2
South Australia	593.3	75.6
Western Australia	790.6	74.0
Tasmania	181.5	73.4
Northern Territory	67.9	72.6
Australian Capital Territory	153.1	82.0
area of usual residence		
capital city	4976.2	72.6
balance of State or Territory	2724.4	69.9
birthplace		
born in Australia	5864.4	72.6
born outside Australia	1836.2	68.5
– mainly English speaking	818.1	76.6
– other countries	1018.1	62.0
level of educational attainment		
with post-school qualifications	3997.5	79.2
without post-school qualifications	3703.1	63.5
sex		
males	4073.9	71.6
females	3626.7	71.7

source: ABS (1998), table 1.3

the pilot EOPP survey

An important source of data used in this study was derived from the survey instrument designed by the USA National Institute of Education and the National Center for Research in Vocational Education in 1982 to collect data on the labour market effects of the USA EOPP. The project was focussed heavily on promoting employment through on-the-job training. The survey instrument was developed to provide a unique record of the on-the-job training provided to workers in entry-level positions. An analysis of the results of this survey with respect to on-the-job training is reported in Barron, Black and Loewenstein (1989) and Bishop and Kang (1984).

In addition to including a large range of questions on the types of on-the-job training provided by employers to their most recently hired employees, the survey also included questions on the search activity undertaken by employers prior to the appointment of the newly hired employee. As in the Barron, Black and Loewenstein study, the data provides researchers with an opportunity to test for the predicted effects of on-the-job training on job matching by employers.

The workplace data utilised in the Australian study was gathered throughout the first half of 1999 from 38 randomly selected firms. The sample size reflects the pilot nature of the study. Information gathered from the survey includes organisational details of the firm such as multi-site firms, full- and part-time employment, labour turnover, wage growth, vacancy trends, and details regarding new and recently hired employees. As shown in table 4, firms were selected from Western Australia, South Australia, Victoria and the Northern Territory.

table 4: business location of the Australian EOPP data

State or Territory	frequency	per cent
Northern Territory	10	26.3
South Australia	10	26.3
Western Australia	8	21.1
Victoria	10	26.3
total	**38**	**100.0**

source: Australian EOPP survey undertaken for the present study

table 5: workforce characteristics of the Australian EOPP data

	frequency	minimum	maximum	mean
total workforce	38	7	1212	241
total part-time workers	36	0	300	27
total temporary workers	35	0	850	29
total full-time equivalence employees	34	0	850	169
total non-managerial staff	34	4	912	176
quits over the past year:				
– non-managerial	35	0	232	19
– managerial	35	0	5	1
involuntarily quits over the past year:				
– non-managerial	35	0	700	24
– managerial	36	0	25	1

source: Australian EOPP survey undertaken for the present study

As shown in table 5, the number of employees at the selected firms ranged from a minimum of seven to a maximum of 1212, although nearly two-thirds of the sample had less than 500 employees. The average number of employees in the sample was 241. The majority of these employees were full-time permanent staff, with most part-time and temporary workers found in particular firms. Consistent with the employee numbers at the firm, the number of non-managerial staff varied over a large range from a minimum of four to a maximum of 912.

effects of employer training on firm outcomes

The data from the Australian and USA EOPP surveys, the Australian CEP survey (see later) and the ABS *Surveys of education and training experience (SETE)* can be used to address a number of issues relating to training and the impact of training on various workplace performance measures. Here we look at three using the EOPP data and the *SETE* data:

- how much on-the-job training is provided by firms in Australia compared with firms in the USA
- the effects of on-the-job training on firm productivity and employee earnings in Australia and the USA
- the impact of school-based education and training on on-the-job training provision in Australia

Since on-the-job training reflects the investment of the firm in specific training, firms that can ensure that labour turnover is minimised will optimise their training investment. Hence, a key component of the survey instrument was to determine if there was some association between voluntary and involuntary labour turnover and the extent of on-the-job training. In the respondent firms to this study, the involuntary labour turnover was almost non-existent, and the voluntary labour turnover rate averaged around 10 per cent for managerial staff, and 17 per cent for non-managerial staff. The extent of association between turnover and training in the EOPP data has not yet been analysed, however.

the provision of on-the-job training by firms in Australia and the USA

As shown in table 6, according to the EOPP survey, notwithstanding substantial variability in Australian firms' provision for training of their incoming employees, Australian firms, on average, provide more training for their in-coming employees than USA firms do, on average. About half of the time of incoming employees in Australian firms is taken up with training over the first three months of their employment, compared with about a third of the time of incoming employees in USA firms. The main sources of this difference are the greater hours spent in Australia on formal training off the job, and on informal training provided on the job by co-workers.

The finding that Australian firms provide *more* training to their incoming employees than their USA counterparts do is quite significant because it has been widely supposed that Australian firms provide very little training to their employees. This does not appear to be true of incoming employees to firms in Australia, although this finding may be influenced by the focus of the USA sample on firms employing low-paid workers. By the same token, it may be that USA firms are relatively low providers of training by world standards, rather than that Australian firms are high providers.

The ABS *Survey of education and training experience (SETE)* indicates that the average number of hours of training received by employees annually is about 135 hours. Since training tends to be concentrated on incoming employees, this figure is not necessarily inconsistent with the Australian EOPP data. If employees who do not receive any training are excluded, the *SETE* provides an estimate of average annual training received by employees of 302 hours.

The Australian CEP data (see later) provides an estimate that, on average, Australian employees received 32 hours of *formal* training each year. This compares with 43.9 hours for incoming employees estimated from the Australian EOPP survey. Both surveys provide a perception of formal training provision by enterprises in Australia that is significantly greater than by enterprises in the USA.

table 6: hours devoted to on-the-job training, EOPP data, Australia and the USA

training activity	average no. hours during 1st 3 months of employment (Aust.)	average no. hours during 1st 3 months of employment (USA)	SD (Aust.)	SD (USA)
hours spent by trained personnel providing most recent worker with formal training	43.9	10.9	118.3	51.1
hours spent by supervisors providing new worker with informal training	51.9	54.3	93.2	93.2
hours spent by co-workers providing new worker with informal training	62.4	26.9	124.6	63.5
hours new employee spent watching others do the job	49.5	53.1	80.2	100.4
hours spent providing new employee with job orientation	13.1	5.9	19.9	13.3
total hours spent providing on-the-job training	**234.1**	**151.1**	**298.1**	**206.8**

source: Barron, Black and Loewenstein (1989) and the Australian EOPP survey undertaken for the present study

the effects of on-the-job training on firm productivity and employee earnings in Australia and the USA

In table 7, using data from the Australian and the USA EOPP surveys, regression estimates of the effects of on-the-job training on starting wages, wage growth and productivity growth, in Australia and the USA, are presented.

table 7: estimates of determinants of starting wages, wage and productivity growth

independent variable	dependent variable				
	mean (hours of training)	*log (in) of starting wage*	*rate of wage growth*	*rate of productivity growth*	*applicants*
log (in) of hours of training first three months (Aust.)	242.3	-0.03 (0.52)	1.32 (0.38)	4.89 (1.31)	0.25 (0.97)
log (in) of hours of training first three months (USA)	51.1	-0.003 (0.51)	0.035 (5.76)	0.176 (7.42)	0.08 (4.46)

note: t values in brackets

source: Barron, Black and Loewenstein (1989) and Australian EOPP survey undertaken for the present study

Table 7 shows that a 10% increase in training is associated with:

- a decline in starting wage of 0.3% in Australia, but only 0.003% in the USA
- an increase in wages growth of only 0.1% in Australia, but of 1.5% in the USA
- an increase in productivity growth of 1.0% in Australia, but of 3.0% in the USA
- an increase in number of applicants screened of 2.5% in Australia, compared with only 1.0% in the USA

What these results mean is that Australian workers pay more for their training (through accepting lower starting wages) than happens in the USA (making Australian on-the-job training look more 'general'—that is, useful in a broad range of work places) than it is in the USA. Australian employers gain productivity increases from the on-the-job training of their employees (not offset by employees' wage increases) of about two-thirds of those in the USA. In fact, nearly all the productivity gains from incoming employees' training were captured by firms in Australia compared with about half of the productivity gains in the USA. Training would appear to be profitable for firms in Australia, therefore, because they pass the lion's share of training costs on to their employees (in the form of lower wages) while reaping moderate productivity gains only modestly captured by their employees in wage increases. At the same time, Australian firms screen employees that are going to receive on-the-job training more thoroughly than USA firms do.

This pattern suggests an outlook among Australian firms that is very alive to the costs and benefits of training, and that sees them reap a strong return from the training they provide, in consequence. This pattern may explain why Australian firms, at least according to the EOPP data collected for this study, provide more training to their incoming employees than USA firms do.

The impact of previous training on enterprise training

What is the impact of incoming employees' prior education and training on the amount of training that firms give them? Several hypotheses can be entertained on this issue. First, the more general education and training that an incoming employee already possesses, the less that will need to be provided at the next firm. The quantity of enterprise-specific education and training that an incoming employee has previously received should make no difference to the amount of training provided at the next firm, however. Second, in so far as prior education and training is regarded by firms as an indicator of a future employee's trainability (i.e. cost to train), incoming employees with more education and training will be given more training opportunities than incoming employees with less education and training. Whether more opportunities will be translated into more hours of training depends as well on how efficiently the training given can be absorbed by employees with different education and training backgrounds.

Data are available for Australia, in both the EOPP data and the *SETE* data, on the number of hours spent in training by employees, classified according to the employees' highest level of educational attainment. In table 8 and figure 1, we present data on the average number of hours spent in training by employees with various educational backgrounds.

Table 8 reveals that although the estimated magnitude of the time spent training employees differs between the *SETE* and the Australian EOPP data, the relationship between the different levels of educational attainment follows a similar pattern.

This relationship is better demonstrated in figure 1, where a comparison between the *SETE* and the Australian EOPP data reveals that employees whose highest educational attainment was at the secondary school level received the largest average number of employer-sponsored training hours per annum. Given the pilot nature of the EOPP data, and the focus in those data on the training of *incoming* employees, compared with a focus in the *SETE* data on all employees, a more exaggerated pattern of association might be expected in the EOPP data. This is observed in figure 1.

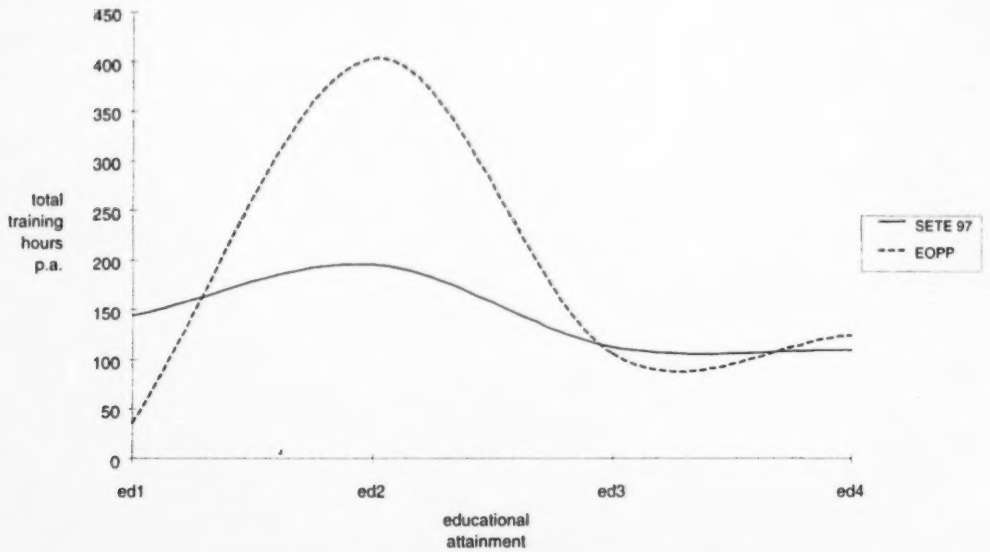
table 8: comparisons of prior highest level of educational attainment and average hours spent on on-the-job training

	mean	SD
SETE 1997		
did not complete secondary school	144	1147
completed secondary school	195	1328
post-secondary (inc. trade)	112	955
degree or higher	109	894
Australian EOPP		
did not complete secondary school	36*	59
completed secondary school	403	109
post- secondary (inc. trade)	105	30
degree or higher	124	18

note: *very few in the sample

source: ABS (1998) and Australian EOPP survey undertaken for the present study

figure 1: comparison between prior highest educational attainment and workplace training



This pattern is made up of two separate influences, however: changes in the probability of participating in employer-sponsored training as educational background alters, and differences in the number of hours of training that employees get when they are chosen by their employer to undertake training.

Further examination of the relationship between educational attainment and employer sponsored training, using a probit model and the *SETE* data, with the dependant variable being whether the employee did or did not receive employer sponsored training, found a highly significant *positive* correlation between educational attainment and employer-sponsored training (significant at the 1% level). The correlation was not significant using the EOPP data, and the signs on the coefficients were mixed.

In other words, the probability of an employee participating in employer-sponsored training *at all* does increase with the educational attainment of the employee. Indeed, relative to those who did not complete secondary school, in the *SETE* data, tertiary-educated employees were 39 per cent more likely to participate in employer-sponsored training, employees who had

completed post-secondary school were 17 per cent more likely to receive training, and those with completed secondary school qualifications were 15 per cent more likely.

However, again using a probit model and the *SETE* data, with the dependant variable being the *number of hours* of employer-sponsored training that an employee received *who received any training at all*, found a highly significant *negative* correlation between educational attainment and hours of employer-sponsored training (again significant at the 1% level). In other words, a typical employee with lower educational attainment who is selected for training receives more hours of training than an employee with higher educational attainment.

A plausible account of the pattern of training provision is that employers are careful in scrutinising who to admit to training programs, with prior educational attainment being an important selection variable that reduces the chances of employees with lower educational attainment being selected. Once selected, however, those with lower educational attainment receive more hours of training than those with higher educational attainment.

the pilot CEP survey

introduction

This part of the study adapts a survey instrument developed by the London School of Economics CEP Corporate Performance Project (under the direction of Michael West).

the Australian pilot CEP survey

The Australian pilot CEP survey was administered by interview to 41 firms in Melbourne, Adelaide, Perth and Darwin during May to June 1999. The questionnaire included a sub-sample of questions from the original CEP survey and a few additional questions relating specifically to this study. It covered a range of issues from profitability, organisational change, the market environment, the nature of the work process, comparative expenditure on different forms of investment, the level of quality control, research and development, HRM and the extent and type of training offered by the firm and the industrial relations environment. Because the interviews took place within the company environment, the interviewees were able to consult company records to verify specific information. Re-wording of the original questionnaire was necessary to localise some of the questions.

Many of the questions solicited a comparative ordinal response, such as 'how is your company compared to your main competitors...'. Several questions were asked about each type of issue and these responses were, in the first instance, combined into indices to measure the identifiable aspect of the firm's environment or behaviour. Details of these indices and their components are given in table 1. Components denoted by an '*' have been scored on an ordinal 1 to 7 ranking scale. Each component has an equal weighting in the associated index. Its numerical value was set to vary in most cases between 0 and 1. Missing values were set to a default value in order to neutralise their effects on each index: zero in the case of binary questions and the average value in the case of the ordinal scales.

table 9: components entering the indices of firm characteristics (CEP survey)

index	high value reflects...	components
profitability	high profitability compared with major competitors	*profitability compared with main competitors
		*change in profitability over last two years
		*market share compared to main competitors
		*current change in market share
		*output per worker relative to physical capital per workers compared to main competitors
		*selling price and quality of product compared to main competitors
company size	large firm	number of employees
market uncertainty	more uncertain or unstable product market environment	*customer demand unpredictable
		*changeable production technology
		*legislation and regulation in a state of flux
		*changeable customer requirements

index	high value reflects...	components
market competition	more competitive product market environment	*high rate of product obsolescence
		*actions of competitors are unpredictable
		*firm has to change practice often to keep up with market
		*entry barriers very low
		*product undifferentiated
		*competition in this industry increased in last 5 years
market concentration	concentrated	*industry is concentrated with dominant firms
industry sector	based on main products	manufacturing, construction, service
work process	rigid work processes with little scope for worker initiative	*experts answer all worker difficulties
		*non-managers take strict orders from supervisors
		*non-managerial staff follow set work procedures
		*quality problems referred to management
		*non-managers have no control over work order
		non-managers are mainly single skilled
		no team working
external labour market	labour is hard to get	*finding suitable people is very difficult
		*find it hard to keep skilled staff
		*currently understaffed
internal labour market	features of an internal labour market (ILM) present	keep skilled staff if temporary fall in demand
		keep extensive data records on workforce
		use extensive methods to screen and recruit new staff
		*skills of non-managerial staff acquire work skills in-house (not from outside firm)
		seniority important for promotion
		managers appointed internally
		non-managers appointed internally
		pecuniary incentive schemes offered to managers
		pecuniary incentive schemes offered to non-managers
		proportion of current staff who are permanent
voluntary turnover		rate of voluntary staff turnover in past year
involuntary turnover		rate of involuntary staff turnover in past year
relative wages	high relative to competitors	*wages for non-managerial staff well above average compared with competitors
		*wages for managerial staff well above average compared with competitors

index	high value reflects...	components
other investments	high relative to competitors	*rate of innovation high relative to competitors
		*marketing expenditure high relative to competitors
		*R&D expenditure high relative to competitors
		*physical capital per worker high relative to competitors
		number of major organisational changes in past 5 years
		proportion of staff dedicated to R & D.
		has formal procedures for recording best practice (2 questions)
unions	more presence	percentage of non-managers belonging to a union
		number of unions at workplace
quantity of training offered	more hours per employee	*high expenditure on training relative to main competitors
		offers formal induction to all employees
		hours of formal induction per employee
		hours of formal training per employee
		hours of formal training increased over past 5 years
		proportion of employees dedicated to teaching others
quality of training offered	more extensive types of training provided	induction communicates company values
		induction is formally evaluated
		overall formal training strategy exists
		years since training strategy began
		each employee has a minimum annual training requirement
		information on training course available to staff
		formal career development procedures exist (2 questions)
		visits to suppliers arranged
		secondments provided (2 questions)
		reforms to training practices been extensive over past 5 years
		employment agreements contain written commitments to training

source: Australian CEP survey undertaken for the present study

factors associated with more training by employers

Tables 10 and 11 present relationships between training quantity and quality, on the one hand, and other features of the firm, on the other. They indicate that neither training quantity nor training quality are clearly associated with industry sector. There is a slight tendency for manufacturing firms to have less and for construction firms to have more training. Small and large firms have the highest propensity to train both in terms of quality and quantity of training.

table 10: mean training indices according to industry sector

industry sector	training quantity	training quality
manufacturing	6.3141	8.2678
construction	8.0368	8.8633
service	7.7082	8.6056
total	**7.2383**	**8.5134**

source: Australian CEP survey undertaken for the present study

table 11: mean training indices according to firm size

number of employees	training quantity	training quality
less than 100	8.6270	8.5256
100 to less than 500	6.0451	7.7872
over 500	7.0688	9.1322
total	**7.2383**	**8.5134**

source: Australian CEP survey undertaken for the present study

Perhaps surprisingly, as table 12 shows, there is a very low correlation between training quantity and training quality.

In table 12, higher numbers of training hours (quantity) appear to be associated with more uncertainty in the product market and higher levels of investment in other forms of capital. Hours of training are also lower, the higher the rates of voluntary and involuntary staff turnover over the past year, as would be expected.

Turning to training quality in table 12, quality is most highly correlated with the index for other forms of investment. It is also positively correlated with other features of an internal labour market and with less rigid work procedures and encouragement of greater worker initiatives.

table 12: correlations between indices of training and other firm indices

	training quantity	training quality
training quantity	1.000	0.026
training quality	0.026	1.000
company size	0.010	0.109
market uncertainty	0.266	-0.161
market competition	0.148	-0.047
market concentration	0.097	-0.153
work process	-0.039	-0.250
external labour market	-0.003	0.091
internal labour market	-0.048	0.293
other investments	0.146	0.434
voluntary labour turnover (past year)	-0.147	-0.198
involuntary labour turnover (past year)	-0.273	0.031

source: Australian CEP survey undertaken for the present study

In order to more effectively isolate the relationships between firm variables and indices of training quantity and quality, regression analysis was undertaken. These results are reported in tables 13, 14, 15 and 16. They should not be interpreted necessarily as causal relationships, of course.

The main statistically significant variables associated with training quantity are the degree of product market uncertainty and the level of involuntary labour turnover (significant at the 5 and 10 per cent levels, respectively). Smaller companies are associated with a greater quantity of training while higher levels of other forms of investment (innovation, workplace re-organisation, R & D, physical capital, marketing) are also associated with higher training rates (quantity of training).

table 13: regression analysis: dependent variable—training quantity index

	coefficients	t	significance
(constant)	2.122	0.312	0.758
market uncertainty	3.325	2.810	0.009
market competition	-0.890	-0.846	0.405
market concentration	1.656	0.605	0.550
work process	-0.760	-0.747	0.461
external labour market	1.334	0.843	0.407
relative wage rates	-2.858	-1.363	0.184
union presence	1.113	0.903	0.374
internal labour market	0.116	0.286	0.777
voluntary labour turnover	-1.032	-0.262	0.796
involuntary labour turnover	-34.006	-1.950	0.062
company size	-26.802	-1.959	0.061
company size squared	25.593	1.763	0.089
other investments	0.848	1.524	0.139

note: $R^2 = 0.40$

source: Australian CEP survey undertaken for the present project

table 14: regression analysis: dependent variable—training quality index

	coefficients	t	significance
(constant)	3.603	0.813	0.424
market uncertainty	-0.216	-0.280	0.782
market competition	0.596	0.870	0.392
market concentration	-2.241	-1.258	0.219
work process	-0.246	-0.372	0.713
external labour market	-0.879	-0.853	0.401
relative wage rates	-0.234	-0.171	0.865
union presence	-0.121	-0.151	0.881
internal labour market	0.610	2.321	0.028
voluntary labour turnover	-0.860	-0.335	0.740
involuntary labour turnover	11.367	1.001	0.326
company size	11.143	1.251	0.222
company size squared	-8.643	-0.914	0.369
other investments	1.070	2.956	0.006

note: $R^2 = 0.46$

source: Australian CEP survey undertaken for the present project

With respect to training *quality*, the classic features of internal labour markets, and high rates of other forms of capital investment, are also the main factors associated with a broad range of

training features (significant at the five per cent level). Greater training quality was also associated with less market concentration, but this was only significant at the 20 per cent level.

To summarise, a high number of hours provided to employees (high training quantity) appear to be associated with uncertain product markets and lower involuntary separations. High training quality appears to be associated with the presence of an internal labour market and a high level of investment in other forms of capital investment.

does employer-sponsored training affect profitability?

To examine this question, a regression analysis was undertaken between the profitability index (as described in table 9) and other characteristics of the firm. All the major variables and indices defined in table 9 were included in the first equation, mainly as a strictly empirical exercise. There is no *a priori* reason why some of these variables should be significant in explaining profitability.

The results, which are presented in table 15, find that the indices for training quantity and training quality are two of the four main explanatory variables of firm profitability. Training quantity is significant at the 20 per cent level and training quality is significant at the five per cent level. Both display a positive sign suggesting that higher levels of training are associated with higher firm profitability.

table 15: regression analysis: dependent variable—profitability index

	coefficients	t	significance
(constant)	1.149	1.000	0.327
training quantity	0.050	1.546	0.135
training quality	0.109	2.196	0.038
market uncertainty	0.014	0.064	0.949
market competition	-0.181	-0.999	0.327
market concentration	-0.148	-0.313	0.757
work process	-0.175	-1.020	0.317
external labour market	0.604	2.222	0.036
relative wage rates	0.700	1.938	0.064
union presence	0.072	0.346	0.732
internal labour market	-0.059	-0.809	0.426
voluntary labour turnover	1.253	1.902	0.069
involuntary labour turnover	-2.948	-0.925	0.364
company size	-2.177	-0.860	0.398
company size squared	2.471	0.945	0.353
other investments	-0.081	-0.746	0.463

note: $R^2 = 0.51$

source: Australian CEP survey undertaken for the present project

In addition, paying higher wages relative to major competitors and experiencing shortages of suitable labour (here coded as 'external labour market') are also associated (positively) with higher profitability. While the variable measuring voluntary labour turnover is significant, it does not display the correct sign, and we have omitted it from the second regression equation presented in table 16.

table 16: regression analysis: dependent variable—profitability index (significant variables in table 15 only)

	coefficients	t	significance
(constant)	0.251	0.382	0.704
training quantity	5.120E-02	2.102	0.043
training quality	6.810E-02	1.728	0.093
external labour market	0.574	2.499	0.017
relative wage rates	0.594	1.963	0.057

note: $R^2 = 0.32$

source: Australian CEP survey undertaken for the present study

The Australian CEP survey data suggest, therefore, that there exists a positive association between firms' profitability and the quantity and quality of training offered by the firm. In addition, the more profitable firms are paying above market wage rates and are operating in labour markets where suitable labour is hard to find and keep (suggesting a climate of expanding demand and competition for labour in industries where firms are profitable).

Other factors, which we would expect to find associated with profitability, are not significant (such as the degree of market competition). This may be more due to the sample size and our inability to model the profit-generating process sufficiently carefully.

The Australian CEP pilot survey undertaken for this study has shown that there is potential to obtain stronger (and, therefore, more valuable) results from a larger survey using this survey instrument.

matched plants

introduction

A series of 'matched plant' studies by the United Kingdom's National Institute for Economic and Social Research (NIESR) in the 1980s and 1990s proved very successful in highlighting the benefits that accrue to firms from a more highly trained workforce.

In this component of the present study, a pilot study was conducted to test whether NIESR's matched-plant methodology could also prove rewarding in demonstrating the benefits of training within the Australian environment.

Two industries, hotels and kitchen furniture manufacturers, were identified as the sectors from which the matched-plant subjects were to be selected. The industries were chosen as the NIESR studies had demonstrated that a range of comparable productivity measures could readily be derived for individual firms. For each industry, three pairs of firms were to be studied, with the pairs coming from three different capital cities in Australia.

Studies were able to be completed for hotel pairs in two States and one other hotel. Furthermore, subjects for the kitchen furniture manufacturers could only be secured in one of the cities.

As a result, in two of the cities a matched pair of participants could not be secured, despite canvassing virtually all potential firms. For kitchen furniture manufacturers, two major problems were encountered. First, there were very few firms of adequate size to participate in the study. Many of the firms approached were three- to seven-person operations which did mainly fitting and very little regular manufacturing upon which a 'typical' productivity measure could be based. An associated factor was that few firms were large enough to have a specialist human resource or personnel manager, the person within organisations who is normally most able and willing to co-operate in training research. Second, confidentiality was considered very important to many firms because of the nature of the information to be collected. Because of small market size, firms feared they could be identified by competitors even if remaining anonymous in the write-up, and this added to the normal reluctance of employers to participate in such studies.

This analysis in this chapter is thus based essentially on the findings for hotels only.

matched-plant studies: a background

Before discussing the outcomes of the case studies, we provide a brief review of the matched-plants approach and some findings from previous studies. The rationale for the approach is straightforward. To determine the impact (return) from a training investment from the firm's perspective, ideally we would like to observe a firm's performance at a given point in time under two alternative states of the world: one in which it has made a training investment and one in which it has not made the investment or has made a different level of investment. Since everything else is held equal, the difference in firm performance represents the impact of the different level of training investment, or of that particular training initiative. In reality, we can observe only one of these states of the world, and somehow need to establish the counterfactual of what the firm's performance would have been if the level of training had been higher or lower.

A range of research methods are used to attempt to establish the counterfactual, or in other words, to establish the 'all other things held equal' condition, each with their own weaknesses

and strengths. Case studies typically look at the same firm before and after a training initiative, and collect a large amount of detailed data. However, external conditions can change, and the selection of firms. Hence the results will be biased towards displaying a high return to training initiatives, and the detailed firm-specific information collected means that results are difficult to generalise to the wider population of firms. Case studies tend to be conducted on firms known to exhibit 'best practice' or where a significant change to training has been undertaken, in which case management has anticipated a positive return. Longitudinal surveys look at the same firms before and after changes in training investments across a wide sample, but again face selectivity-bias and attrition-bias problems. Plus it is not possible to collect all the firm-specific details that may impinge upon training outcomes and firm performance for a large sample of firms. The essence of matched studies is to control for a wide range of firm-specific and environmental effects by collecting detailed information for closely matched firms, so that, as far as is possible, the firms differ only with respect to training effort. Analysis of cross-sectional surveys seek to do the same, by controlling for variables such as industry and firm size to isolate the impact of differences in the level of investment in training.

The following research is based upon the series of matched-plant studies conducted by NIESR. Other studies using a matched-plant approach include Hashimoto (1994) and Berg (1994). These studies attempted to determine the sources of differences in productivity of similar firms located in different countries, and thus to cast light on broader international productivity differences. An initial pilot study was based on around 36 interviews of plants in Britain and Germany in 1983–84 that manufactured relatively simple products of the metalworking trades (Daly et al. 1985). Concentrating on simple and 'standardised' products reduces the scope for apparent differences in output to arise as a result of unobserved differences in the quality of output. Apart from product, the most important 'matching characteristics' considered were firm size in terms of employment and production runs, while productivity was measured in terms of machine output per unit time. The study found strong evidence of lower productivity in British firms. Though these could be related to a range of factors, including to technology, maintenance and other work practices, the authors ultimately attributed these to greater skill and educational levels of the German workers, particularly at the foreman and production engineering levels.

In 1986–87, interviews were carried out for the woodworking industry, with fitted kitchens chosen as the standardised product within the wood furniture sector (Steedman & Wagner 1987). Though work in this sector was considered to require the same high degree of precision and technical complexity as in the metalworking sector, output per employee was included as a productivity measure instead of output per machine per unit time. The productivity gap was again evident, and the far higher proportion of German workers with formal vocational qualifications, leading to a quicker uptake of new technology and methods, was highlighted as a source of this gap. In later studies, the clothing manufacture sector was also examined (Steedman & Wagner 1989), and the approach was extended to the service sector using the case of hotels. The service sector is particularly interesting as it depends on person-to-person service, and hence large productivity differences may be unexpected. Differences in quality were standardised using hotel ratings from the widely used Michelin guides. Yet, on productivity measures of guest nights per employee, guest nights per housekeeping employee and room-nights per reception employee, the German productivity advantage was again evident. Finally, matched studies in manufacturing in the Netherlands, where a similarly higher proportion of workers obtain vocational qualifications when compared to Britain, were included to show that the result of lower productivity in Britain held beyond Germany (Mason et al. 1992).

hotels

With respect to the hotel industry, the major finding of the NIESR studies was that German firms enjoyed a significant labour productivity advantage, of the order of 50 per cent, over British hotels. The researchers attributed this difference to the higher proportion of the

German hotel workforce with formal vocational education and training (VET) qualifications, and the associated implications for workforce flexibility and innovation.

In order to match the design of the European studies, the Australian hotels in the present study were planned to be selected from within the three-star category, in order to reduce the effects of quality differences on the output measures. In the end, the hotels were selected from within the three- to five-star category, so that some of the variance in productivity measures may be attributable to quality differences rather than to *pure* productivity differences. In the final write-up of this part of the study, these quality differences will be addressed by weighting outcomes by relative room prices.

For each firm, a considerable amount of qualitative and quantitative data needed to be collected. One face-to-face interview with the personnel or human resource manager in each hotel was arranged. The respondent was forwarded material outlining the background of the overall study and a copy of the matched-pair pro-forma for hotels which outlined the data items required. Background information was also collected through hotel promotional brochures. The bulk of the required information was obtained during the interview, though typically some items needed further investigation by the respondent and were forwarded to the researchers afterwards.

Following the NIESR hotel studies, the major work areas analysed were housekeeping and reception, with the intention of gaining comparable productivity measures across the hotels for these functions. As far as possible, the food and beverage areas were exempted from analysis because of the large variation in standards or quality which occur between such facilities from hotel to hotel and the obvious difficulty in controlling for such differences.

background characteristics

For purposes of confidentiality, the hotel subjects have been randomly renamed as Hotel Aardvark, Bettong, Caribou, Dugong and Echidna, with some characteristics reported in categories rather than exact numbers. Probably the most significant differences across the hotels that are likely to influence training practices and productivity lie in their size and the range from three to five stars (see table 20 for a summary of hotel characteristics). All except Hotel Bettong are part of a larger corporate chain of hotels, which typically provided access to resources such as centralised reservation systems, training manuals and in-house training courses provided through the respective parent.

There is also considerable variation in the markets that the hotels service. Tourists comprise around 90 per cent of the Bettong's customers while, at the other end of the scale, business customers make up around 80 per cent of Hotel Caribou's clientele. The Aardvark and Bettong hotels experience considerable fluctuation in demand from peak to low season. Occupancy rates are more stable at the Caribou, Dugong and five-star Echidna, fluctuating from around 65 per cent to 90 per cent over the year.

Another notable difference is that the housekeeping function at the Aardvark is not undertaken by hotel employees, but is contracted out to an agency. To complete the study, additional information has been collected from that agency in relation to their operations at the Aardvark.

training practices: use of formal qualifications

With the exception of Hotel Echidna, formal qualifications afforded little weight in the hotels' training and recruiting practices. Hence there is an emphasis on in-house and on-the-job training rather than formal VET. Table 17 shows the proportion of staff in each function area with formal qualifications. For the Aardvark, the level of attainment of formal qualifications is remarkably low. Three of the five persons in managerial positions had formal qualifications, but none of the hotel's other employees. Among the ten workers from the contracted housekeeping agency, only the supervisor possessed any qualifications. In part, this is because of a shortage of labour with relevant qualifications in the local area, for the Aardvark does

look for formal qualifications when recruiting. In fact, all hotels saw formal qualifications as a plus when selecting staff, but not as valuable as previous experience.

The general view was also that formal qualifications were no substitute for in-house training, although the Aardvark's training manager believed they made workers easier to train. From table 17, it is obvious that the demand for formal qualifications varies between function areas. Very few housekeeping employees possessed formal qualifications in any of the hotels. The Caribou's training manager stated that qualifications were necessary in managerial positions, and both qualifications and experience were important in food and beverage. Despite having the highest proportion of employees with formal qualifications, even at this hotel the view was that experience was preferred in the other areas. The Echidna, which did place considerable value on formal qualifications in the reception area, similarly expressed a reluctance to put on graduates straight from college because of the importance of prior experience.

table 17: proportion of employees with formal qualifications by function area (total employees in parenthesis)

	Aardvark	Bettong	Caribou	Dugong	Echidna
management and administration	50%	57%	75%	71%	72%
	(6)	(7)	(4)	(7)	(68)
reception	0%	47%	100%	33%	38%
	(7)	(17)	(6)	(12)	(39)
housekeeping	10%	4%	0%	0%	5%
	(10)	(25)	(13)	(18)	(65)
food and beverage	0%	24%	41%	42%	30%
	(21)	(21)	(22)	(12)	(209)
maintenance and other	0%	50%	0%	33%	100%
	(4)	(2)	(1)	(3)	(9)
total	**8%**	**26%**	**39%**	**29%**	**35%**
	(48)	**(72)**	**(46)**	**(52)**	**(390)**

source: Australian 'matched hotels' survey undertaken for the present study

the reception area

In the Aardvark's reception area, the front office manager delivers the majority of training on the job. The parent company provides training modules and materials but, by the regional trainer's own admission, training is relatively unstructured and is not as effective as it should be. On average, reception staff would receive only around two hours combined of formal and informal training per month. Formal training is limited to two induction programs for new employees and training in complaints resolution, which is conducted on a needs-only basis. The training in complaints resolution is delivered off the job by the chain's regional trainer. However, staff are reluctant to participate, as they are required to attend on their days off to do so.

Training practices are similar for the Caribou and Dugong Hotels. All new employees at the Caribou receive a two-hour induction course, followed by on-the-job training with a mentor which may last from two days to two weeks depending upon the employee's knowledge. The hotel itself conducts no other formal in-house training. The parent company runs short courses, but these are not provided for housekeeping or reception staff, for whom there is no regular ongoing training. The Dugong's formal induction program for all new employees is longer at three hours, but with no formal on-the-job follow-up component. The parent company provides videos and manuals for the induction training. Ongoing training is on an *ad hoc* basis. The department head decides if each individual is lacking skills or needs development and similarly makes an assessment as to the effectiveness of the training.

As discussed above, the Echidna values educational attainment and formal qualifications quite highly for reception staff. It is quite selective in recruiting, targeting persons who are multilingual, have completed high school plus a reception or desk course up to level 3 (3-4 years, mostly from hospitality college) and have extensive previous experience. Staff also need to have used computer reservation systems and be computer literate and possess good personal communication skills. All employees from managers down receive two days of induction training. Considerable further training has been required as a result of the adoption of new systems—however, there is little ongoing training for reception staff. Training is primarily to refine skills and to adjust new employees to the company culture. It would seem that the Hotel Echidna is in a position to be highly selective in its recruiting—owing to being a five-star hotel and being able to offer a career path through the parent company and, possibly, paying relatively high wages within the industry—and thus able to attract staff who require a minimum of further training.

The Bettong puts most effort into the training of its reception staff. All staff receive orientation and induction training followed by ongoing 'cross training' over the first 12 months. The purpose of this is to ensure that after their first year all staff are multi-skilled between the functions of porterage, telephonist, reservations and reception. Employees' first two weeks are devoted to training, with one week of formal training followed by one week of informal one-on-one training with a supervisor or duty manager. Following this initial period, the ongoing training amounts to around two hours per week, with appraisals after six weeks, 12 weeks, six months and one year.

housekeeping

In four of the hotels the training requirement in the housekeeping area was considered to be low. Hotel Echidna, with the need to maintain five-star standards, provided the exception. For Hotels Caribou and Dugong, the approach to training in housekeeping is the same as for the reception area. All new staff receive short induction training. This is followed up with on-the-job training with a mentor, which may last from two days to two weeks for Caribou employees, with no formal on-the-job follow-up component at the Dugong.

As discussed, the housekeeping function in Hotel Aardvark is carried out by a sub-contracted agency. Due to fluctuations in demand from low to peak seasons, all the contractor's employees are hired on a casual basis. Little need is seen for ongoing training, but initial training of housekeepers is rigorous and closely designed and monitored to ensure a set level of quality and productivity is attained. An induction program covers some 20 components. Many of these cover the essentials of the job, such as location of supplies and use of housekeeping trolleys, while some provide contextual background about the company, the relevant hotel and the importance of the housekeeping function to the guests and the hotel's standards.

At Hotel Bettong, training in the housekeeping area is tied to previous experience. Only one of the 25 housekeeping staff, a duty supervisor, possessed formal qualifications. All new employees receive four hours of formal induction training. For staff with prior experience, this will be followed by 30 hours of on-the-job training with a duty supervisor on a one-on-one basis. The amount of extra training will be greater for recruits with no prior experience, typically in the vicinity of 50 hours over the first three months. Additional training is provided for persons promoted or recruited to supervisor. In their first three months, supervisors attend two hours per week in external training on leadership and supervisory skills.

Training in the Echidna's housekeeping area is rigorous and workers' standards are closely monitored, even though no formal skills or competencies are recognised. Again, new employees receive two days of company induction training. Each department then has its own development plans and training modules. In housekeeping the orientation can last for up to four weeks, and averages two weeks. The employee will then work with a manager, followed by a supervisor and then an experienced room attendant. After a four-week period, employees must attain a minimum work rate of 14 rooms within a seven-and-a-half-hour shift.

overall training assessment

On the information provided in the interviews, we have ranked the hotels against each other as follows:

- high trainer: Hotel Echidna
- medium–high trainer: Hotel Bettong
- medium trainer: Hotels Caribou and Dugong
- low trainer: Hotel Aardvark

Training at Hotel Aardvark falls well below what would be considered 'best practice' in the industry. This applies not only to the amount of training provided, but also the lack of any competency-related structure or formal evaluation processes. The main benefit from training is seen to accrue by way of higher motivation and lower staff turnover. This is reflected in improved customer service rather than higher quantitative rates of output.

In addition to its two-hour induction training for all new employees, the Caribou's parent company runs short courses in other areas. These are run around every six months and will typically be of one day's duration and targeted towards sales, management and the food and beverage area. Training is evaluated only by the parent company, and this is on the basis of feedback from the individual hotels. Caribou's respondent rated the hotel as a medium training provider. Despite what appears to be a quite modest investment, a range of benefits from training is perceived. These include higher productivity, lower turnover, and self-improvement and greater confidence for staff.

Hotel Dugong also rated itself as a medium training provider. New employees appointed to managerial positions may receive additional formal training depending upon their skill levels, but no further ongoing training is provided on top of its three-hour induction course for the reception or housekeeping areas. Rather, department heads make decisions on an individual basis as to whether workers are in need of skills development and make recommendations to the human resources manager. Training is evaluated informally, and the main benefits perceived from training are higher motivation and increased knowledge and output.

A far greater emphasis on training is evident in the Bettong, as outlined above in the discussion of training in the reception and housekeeping areas, and thus we have rated it as a medium–high trainer. Even with a greater proportion of employees with existing formal qualifications, in-house training is far more structured and systematic. Each of the four managers possesses formal qualifications, as do around half of the 17 reception staff. Use is also made of external training providers. However, the Bettong still considered itself a 'medium' trainer in the industry. Although it is part of a chain 'brand', there is no central human resource or training function that provides training modules or materials. Hence it is not in a position to provide the same quality and quantity of training that would be provided in the hotels in the major chains. At present, the human resources manager is trying to shift the focus of training from 'damage control' towards development training. Training is designed largely to fix problems that occur, and the benefits are measured by the elimination of problems (e.g. customer complaints). Training evaluation occurs within the same mind set—the elimination of problems. It is hoped that greater development-oriented training will bring greater benefits in the form of increased staff morale and lower turnover plus improved productivity.

The Echidna's training manager assessed the hotel to be a medium level training hotel. While this may be so within the four- to five-star sector, the Echidna exhibited a stronger training culture and appeared to offer more structured training than the other hotels studied here. Individual departments have their own development plans and training modules in addition to the company induction training, and these may last from two days to four weeks. Hotel Echidna has 60 employers classified as trainers plus a supervising training officer. Training is formally and selectively evaluated, with individual programs being scrutinised intensively over a one-to-two-year period. This is supplemented by informal feedback from managers and other employees on the progress of trainees. The main benefits seen to accrue from training are lower employee turnover and higher motivation. Training is also seen to increase

productivity and flexibility, but the scope for this is limited because of pay structures and other industrial relations regulations facing the hotel.

technology, innovation and other productivity factors

Hotels Aardvark and Bettong were both considered by their respective respondents to be poorly laid out in terms of productivity considerations. The Aardvark was built prior to 1980. There was a partial refurbishment in 1995, and the reception area was refurbished a few years prior to that. More recently, all offices have been relocated together on the one floor, which has improved communication. The hotel's current reservation system was implemented seven years ago and a standard switchboard is also used. There has been no significant process or technological innovation implemented for over five years. The housekeeping contract agency reported no innovations over the past ten years that would increase efficiency or standards in housekeeping. The manager further observed that when refurbishment did occur, the agency was not consulted with respect to possible changes or innovations that may save labour in housekeeping.

Hotel Bettong was converted to a hotel from pre-existing premises and thus was not specific-built as a hotel. There was a major refurbishment just over ten years ago and over 100 new rooms built on approximately five years ago, but inefficiencies in design still exist. The laundry, for example, is located a considerable distance from rooms, which makes it difficult for housekeeping staff, particularly in bad weather, and the rooms are spread over such a distance that two staff are required on the night-auditor shift when most hotels would have been able to cope with only one for the same number of rooms. A new reservation system with an interface with a point-of-sale food and beverage system was adopted in the last five years. The human resources manager feels this has actually impacted negatively on productivity because of higher training requirements, particularly in the face of labour turnover. The system is not considered user-friendly, taking two to three weeks for an individual to become proficient with the system, and the hotel has had to bring in specialist trainers from interstate on several occasions. There have been no recent innovations with respect to work practices or equipment in the housekeeping area.

On average, rooms/areas in Caribou are refurbished once every ten years. Products that 'wear well' are sought, but little attention is paid in the design phase to potential labour saving in housekeeping. In Hotel Dugong, soft furnishes are replaced every 12 months with a view to improving appearance, again unrelated to productivity. The Echidna has had several floors of the hotel, the front of the hotel and a number of the function areas refurbished recently. The impact of refurbishment is seen as revenue increasing rather than productivity enhancing. While some procedures had changed in housekeeping, this was not related to new technology and the respondent saw a limit to the extent greater productivity could be pursued without compromising service standards. The only technological innovation that could be identified in the Echidna's housekeeping area related to TV menus, which improved access to information for guests but did not impact upon productivity.

The Echidna was the most advanced in terms of information technology. It uses a central reservation system through the parent company that is linked to purchasing, accounts, housekeeping, food and beverage, engineering and materials management. The hotel has made a number of innovations impacting upon the reception area in the last five years. These include the development of an individual customer database; availability of accounts, email and reservations facilities built into rooms via television menus and a 'room rate software' which monitors supply and demand and feeds into the rates charged on a daily basis. The Echidna has two full-time employees looking after computer systems, and the various innovations have required a large investment in training of other reception staff—estimated at an average of five weeks and cost of $20 000 for each user.

In all five hotels, informal avenues existed for employees to input new ideas and innovations, and the processes were more formally established in the Dugong and Echidna through group meetings. No respondent identified any restrictive work practices that could be overcome

through greater training or a more skilled workforce, other than a greater capacity to deal with *ad hoc* problems (Hotel Dugong).

As would be expected in this day and age, computers featured in the technological environment of all hotels, though only the Bettong and Echidna could acknowledge any significant innovation in the last five years. Hotels Caribou and Echidna look to hire computer literate staff in the reception area, but not to the extent of expecting formal qualifications in the field. The Caribou plans to implement a new front office system shortly, partly due to Y2K compliance obligations. This will require around three days of training for all staff in the front office area. All four hotels, which were part of a larger chain, use central reservation systems via their parent companies, and Hotel Dugong expects to have an internet presence in the near future.

productivity measures

From the information provided, a range of productivity measures was calculated for each hotel. The ratio of guest nights and occupied rooms per employee and per full-time equivalent (FTE) employee was calculated for the hotel overall (net of employees in the food and beverage area) and for reception and housekeeping individually. The figures are presented on a weekly basis in table 18. Only two of the hotels maintained records on guest nights.

table 18: weekly guest nights and occupied room nights per employee

	Hotel Aardvark[a] (low trainer)	Hotel Bettong (med-high trainer)	Hotel Caribou (med. trainer)	Hotel Dugong[d] (high trainer)	Hotel Echidna (high trainer)
overall productivity[b]					
guest nights/employee	20.4	22.3	n.a.	n.a.	n.a.
guest nights/FTE	39.0	23.1	n.a.	n.a.	n.a.
occ. rooms/employee	12.2	9.3	21.5	24.6	9.1
occ. rooms/FTE	23.3	9.6	22.4	25.9	14.2
housekeeping					
guest nights/employee	74.8[c]	43.2	n.a.	n.a.	n.a.
guest nights/FTE	134.6[c]	55.3	n.a.	n.a.	n.a.
occ. rooms/employee	44.7[c]	18.0	39.7	54.7	25.3
occ. rooms/FTE	80.5[c]	23.0	43.0	59.7	32.2
reception					
guest nights/employee	96.2	76.8	n.a.	n.a.	n.a.
guest nights/FTE	134.6	81.4	n.a.	n.a.	n.a.
occ. rooms/employee	57.5	32.0	86.0	82.1	42.1
occ. rooms/FTE	80.5	33.9	86.0	85.6	46.9

notes: [a]Figures for Hotel Aardvark are inclusive of contracted housekeeping workers

[b]Total employment and total FTE employment used in these measures is net of employees in the food and beverage area

[c]Figure relates to contract agency's workers at Hotel Aardvark

[d]Figures for Hotel Dugong waiting further verification

source: Australian 'matched hotels' survey undertaken for the present study

The productivity measures are sensitive to occupancy rates and thus change seasonally—productivity is higher during the peak season and falls during the low season. This raised a problem for comparability, as the respondents did not provide data for equivalent periods. The Aardvark faces large seasonal swings, and the figures provided related to a half year that

covered much of the low season. Though the Bettong also experiences considerable seasonal differences, average figures for 1998 were provided. The others provided figures for the most recent week or month. While these were also predominately in quieter periods, these hotels had more stable occupancy rates and can be taken as a reasonable approximation (or only a slight underestimate) to year averages.

We concentrated on the measures based on occupied rooms as all hotels could provide these. The Dugong and Caribou have the highest overall measures, but the Aardvark becomes comparable when employment is adjusted to an FTE basis. The two hotels that have been rated as the highest trainers, the Bettong and Echidna, show the lowest overall productivity. This pattern holds for the individual housekeeping and reception areas. In housekeeping, the Aardvark, despite being assessed during a low period, displays a large productivity gap—remembering the housekeeping duties at this hotel are carried out by workers from a contracted agency. An estimated 80 rooms per FTE employee in housekeeping was attained, compared to 60 for the next highest (the Dugong) and 23 for the lowest (Bettong).

In the reception area, the Aardvark, Caribou and Dugong all achieve productivity rates of around 80–85 occupied rooms per week for each FTE employee. Again this represents a large productivity gap between the Echidna and the Bettong, which also recorded the lowest productivity on this measure.

A number of factors may account for the productivity differences between the hotels, and it appears that these outweigh the effect of differential levels of investment in training. For the Hotel Bettong, these include problems it has experienced in implementing the interactive reservation/point-of-sale food and beverage system; the presence of town houses which are more labour intensive on the housekeeping side, the sub-optimal layout of the complex and the absence of those facilities provided by a parent company.

The favourable performance of the Aardvark's housekeeping section may be a result of the efficiencies or flexibility of using contracted housekeeping services. It is interesting to note that Aardvark's agency, the Bettong and the Echidna all specify set standards that must be achieved by housekeepers in terms of the time allowed for room cleaning. The contractor expects an average of 2.5 rooms per hour and the workers at the Aardvark currently exceed that with an average of three rooms per hour, or one room every 20 minutes. To make up rooms in which the guests have checked out, the Bettong allows 25 minutes for standard rooms, 30 minutes for deluxe rooms and 45 minutes for town houses, and to make up rooms for guests who are staying, the respective time allowances are 15 minutes, 15 minutes and 30 minutes. The Echidna expects at least 14 rooms to be completed within a 7.5-hour shift, or just under one every 30 minutes. The added time here is likely to be a result of the additional features of the rooms in the five-star Echidna. In addition, the Echidna employs a larger number of other staff on top of housekeepers in this area (listed as 'other cleaning staff'). Thus, on this measure, the performance across these three hotels would seem quite comparable, and the low productivity of the Bettong's housekeeping area identified above seems difficult to fully reconcile.

The Caribou's relatively low productivity in housekeeping may also be partly attributed to it being a four-star rather than three-star hotel, remembering that the Caribou and Dugong have very similar training practices. The Dugong is likely to reap some benefits from economies of scale, being considerably larger than the Aardvark and Caribou. However, size has done little to help the Bettong's productivity. As stated, much of the adverse productivity gap identified for the Echidna, which we ranked as the highest trainer, may be attributable to the higher level of service offered in five-star accommodation.

In order to check on the impact of quality differences on productivity outcomes, we weighted the results for the four- and five-star hotels by their standard room rates relative to the least expensive of the three-star hotels. The results from doing this are shown in table 19.

table 19: weekly guest nights and occupied room nights per employee

	Hotel Aardvark[a] (low trainer)	Hotel Bettong (med-high trainer)	Hotel Caribou (med. trainer)	Hotel Dugong[d] (med. trainer)	Hotel Echidna (high trainer)
overall productivity[b]					
guest nights/employee	20.4	22.3	n.a.	n.a.	n.a.
guest nights/FTE	39.0	23.1	n.a.	n.a.	n.a.
occ. rooms/employee	12.2	9.3	28.0	24.6	17.3
occ. rooms/FTE	23.3	9.6	29.1	25.9	27.0
housekeeping					
guest nights/employee	74.8[c]	43.2	n.a.	n.a.	n.a.
guest nights/FTE	134.6[c]	55.3	n.a.	n.a.	n.a.
occ. rooms/employee	44.7[c]	18.0	51.6	54.7	48.1
occ. rooms/FTE	80.5[c]	23.0	55.9	59.7	61.2
reception					
guest nights/employee	96.2	76.8	n.a.	n.a.	n.a.
guest nights/FTE	134.6	81.4	n.a.	n.a.	n.a.
occ. rooms/employee	57.5	32.0	111.8	82.1	80.0
occ. rooms/FTE	80.5	33.9	111.8	85.6	89.1

notes: [a]Figures for Hotel Aardvark are inclusive of contracted housekeeping workers

[b]Total employment and total FTE employment used in these measures is net of employees in the food and beverage area

[c]Figure relates to contract agency's workers at Hotel Aardvark

[d]Figures for Hotel Dugong awaiting further verification

source: Australian 'matched hotels' survey undertaken for the present study

The association between training and productivity is not inverse to the same extent as it was before. However, the results for the Bettong are still way out of line with the other hotels. It may be that we have made a mistake in calculating the productivity figures for the Bettong. However, if the Bettong is excluded from the sample, there is still hardly any positive association between training and productivity.

comparisons with NIESR's results

The NIESR utilised three measures of productivity—guest nights per employee, guest nights per housekeeping employee and occupied room nights per reception employee. This was on the basis that it takes longer to clean a room if more than one person stays in it, but should take about the same time per room for check-in/check-out irrespective of the number of guests staying. The averages for Germany and Britain are provided in table 20. It is stated that the total figure is based upon full-time employees, and we assume that this is also so for the individual housekeeping and reception measures.

The large productivity gap was attributed to the far higher proportion of employees in German hotels with formal VET qualifications and differences in work practices, innovation and physical capital, though these latter factors were also argued to arise in part because of skill differences.

table 20: productivity estimates for British and German hotels, 1988–89

	Britain	Germany
guest nights per employee (total)	14.42	28.07
guest nights per housekeeping employee	42.35	72.31
occupied room nights per reception employee	40.81	64.82

source: Praise, Jarvis and Wagner (1989), pp.52–54, original figures multiplied by seven to give weekly figures

For the National Institute's study, 'middle priced' hotels were targeted. It can be seen that the British hotels achieved productivity levels at the lower end of our estimates for the Australian hotels (looking at the FTE measures), while the German hotels achieved productivity levels just under the higher performing Australian hotels. It should be noted that the field work for the Prais et al. study was undertaken from mid-1988 to mid-1989, over ten years ago, and productivity levels are sure to have risen significantly since then. The authors also noted that many of the British hotels were of a considerable age, some not even suited to innovations such as chambermaid trolleys.

A further point of interest is that Prais et al. ran a regression analysis on their sample to attempt to explain productivity differences between the hotels. This confirmed the presence of productivity gains from scale and lower measured productivity for higher quality hotels.

preliminary findings from the hotel study

The data available from the hotels studied to date reveal little with respect to the influence of training practices or the workforce's endowment of VET qualifications on productivity levels. In contrast to the NIESR hotel studies, there seems very little consideration given by managers to innovation in technology or work practices, and hence little information was provided on the potential impact of training in facilitating such change. In all, it could be said that the commitment to training in four of the hotels included above is poor, and is reactive rather than proactive. Differences in the formal qualifications of the workforces in each hotel are too small to warrant any conclusions, and, in any case, respondents seem to place little value on formal qualifications relative to previous experience. The exception is the five-star Echidna Hotel, which presents obvious comparability problems with the other hotels.

The productivity measures also fail to give any clear picture. Significant productivity differences were identified across the hotels. However, it was the higher training firms that reported the lowest productivity. This can be seen most clearly from table 21, in which the hotels are ordered left to right according to their rankings of low trainer to high trainer. In part, this may reflect the difficulty of recruiting closely matched hotels, to which we have already alluded. However, when the results are reweighted by differences in the price of standard rooms between the different classes of hotels, there still is no obvious positive association between training and productivity like that found in Prais's work. Future work would benefit from focusing on a single 'star' rating and recruiting many more hotels to the study, despite the greater recruiting difficulties this presents. More consideration also needs to be given to standardising productivity measures for seasonal influences. However, in the Australian environment, it may also be the case that closely matched firms are unlikely to offer the variation in training practices and workforce qualifications that are necessary to draw solid inferences from this approach.

table 21: background characteristics, training practices and productivity measures—summary

hotel	Aardvark	Caribou	Dugong	Bettong	Echidna
association	part of chain	part of chain	part of chain	independent	part of chain
star rating	5-star	4-star	3-star	3-star	3-star
no. rooms	75–100	100–125	200–300	200–300	350–450
overall training rank	Low	medium	medium	medium-high	high
staff with formal qualifications	8%	39%	29%	26%	35%
productivity – original					
housekeeping	high	medium	medium-high	low	low-medium
reception	high	high	high	low	low
overall	high	high	high	low	low
productivity – weighted					
housekeeping	high	medium	medium	low	medium
reception	medium	high	medium	low	medium
overall	medium	high	high	low	high

fitted kitchen manufacturers

As with hotels, firms in each pair were selected from the same city to control for environmental factors. The respondent was forwarded material outlining the background of the overall study and a copy of the interview pro-forma, which outlined the data items required. Qualitative and quantitative data were gathered during face-to-face interviews with follow-ups as required. With a relatively small number of firms in this industry and a general unwillingness of employers to participate, obtaining closely matched pairs has proven extremely difficult.

background characteristics of manufacturer 1a and manufacturer 1b

As shown in table 22, manufacturer 1a is a very large firm in an industry characterised by small competitors. Manufacturer 1a mainly supplies cabinet-makers, distributors and builders rather than the final customer, though they also service the renovation and DIY (do-it-yourself) markets. Currently, the factory is operating at 30 to 40 per cent of capacity in terms of capital, running one shift plus over-time. If demand increased, output could be doubled with additional labour and a second shift.

table 22: background characteristics of fitted kitchen manufacturers, matched pair 1

	manufacturer 1a	manufacturer 1b
ownership	family business	single company
annual turnover	$5–$10 million	$700–$900 000
target market	budget residential and commercial	premium residential
product	mostly pre-assembled units, some 'flat packs' for DIY assembly	pre-assembled units
total employment	47	8

source: Australian 'matched kitchen cabinet manufacturers' survey undertaken for the present study

Manufacturer 1b is a far smaller operation, with just eight employees. Manufacturer 1b's productivity disadvantage is not the need for standardisation. It regards every job as unique. Manufacturer 1a implicitly shares this view as it regards batch size as very important.

training practices

Manufacturer 1a has ten employees in management and administration, twenty-seven in the production area and ten in sales. Formal qualifications are prevalent in the production area, where there are nine tradespersons and two apprentices. One of the managers also has trade qualifications and some of the clerical staff have formal qualifications. For manufacturer 1b, four of the five workers in the production area are qualified tradespersons and the remainder is currently indentured as an apprentice. No other staff possess formal qualifications.

conclusions

A great deal of difficulty was experienced in firm recruitment in the kitchen cabinet industry. Firms were very sensitive about identification and the type of information they were being asked to provide. This result emphasises again the importance of carefully identifying sectors where matched firm studies are unlikely to face this problem.

case study X

case study X: summary

Company X is a dynamic medium size firm operating in a mature and developed service sector market. The company has grown rapidly in recent years. It has a rigorous five-day training program for new employees which includes testing and formal assessment.

The CEO believes training pays, although no formal cost-benefit analysis has been undertaken by the firm. One of the most important perceived benefits of training is a reduction in worker error. The firm pays a bonus system which is related to whether or not workers make an error during the month. Using administrative data on employee characteristics, test scores and bonus rates, an evaluation is conducted to assess the impact of the level of training on productivity. The methodology tested was to follow a two-step estimation procedure. First, the training test scores are modelled as a function of individual characteristics, such as IQ and level of education. If this can be modelled effectively, then the residual—the component of the test score not explained by the individual's pre-existing attributes—can be taken as a measure of the level of training imparted. Second, the measure of training can then be included in a model of productivity (as measured by the bonus rate) to provide an estimate of the effect of the level of training provided on a workers' productivity.

With only restricted administrative data available, in the event it was not possible to accurately model the level of training imparted to each worker. Consequently, the test scores were entered directly into the model of productivity. While this was found to be associated with a higher bonus rate, it is difficult to clearly disentangle this 'training effect' from other positive characteristics that would, in any case, have led to both higher training test scores and productivity. However, the results achieved suggest the approach offers considerable potential applied to an organisation that could provide a richer and larger data set. A second finding is that productivity appears to increase with the employee's tenure (firm-specific experience).

introduction

Company X is a dynamic medium-sized firm operating in a mature and developed service sector market. The company operates nationwide and has grown very fast in recent years. Because company X has an extensive internally developed training system, it was decided to take it as a case study for the current project on enterprise training.

training

Company X uses a labour intensive production process. A formal induction period of five days is offered to all production line workers. Training, which provides across-the-board skills ranging from product knowledge, to sales and administration, involves structured and formally supervised on-the-job training. Workers are formally tested at the end of training and receive a test score out of 100 for each of two main company subject areas. Higher level training and testing are available for specialist employees. However, these are not included in the analysis for this paper. After a period of several weeks, the worker is again tested by their

regular supervisor. Finally, the worker is tested and rated by head office under controlled conditions. Employees who pass a critical standard are given an 'expert rating'.

The chief executive officer (CEO) is quite clearly of the mind that his training 'pays' for itself—however, he has not undertaken a formal assessment of this. He believes that reducing worker error is one of the main ways training assists the profitability of the firm.

staff background

Staff are recruited from a variety of educational backgrounds. No levels of formal schooling or vocational qualifications are required—however, a reasonable number have some tertiary education. A considerable proportion of production workers is casual, and a relatively high turnover of both production and managerial staff is experienced.

Most of the skills required to perform the job can be learned in a relatively short period of time, and the payback period from induction training is relatively short (or less than the average staff duration period). The CEO does not regard high voluntary attrition as a negative attribute. High turnover contributes toward the freshness and interest by staff in their job. Old hands have a propensity to deteriorate into poor work habits.

incentive schemes

Staff are paid bonuses and other incentive payments for high productivity. The latter are measured against a clearly defined output scale. Penalties also exist for errors. Errors include breaches of some of the procedures specified during the induction-training period. Penalties reduce the level of incentive payments each month, *ceteris paribus*. An employee who commits an error in any given month does not receive 'bonus' status.

effects of training on error rates

A small evaluation of the effects of the induction training scheme on staff error rates using administrative data was undertaken for this project. As all production level employees undertake induction training, it was not possible to test for the effects which training *per se* has on the error and bonus rates (or any other measure of employee productivity). Instead, training test results (scores out of 100 and expert rating status) have been used as measures of how well an individual employee has been taught.

Factors other than the quality of the training program are expected to affect the test scores and expert rating status. These include age, sex, educational level, IQ, work experience and unmeasured personal characteristics such as diligence and application. To identify these effects, training test scores have been formally modelled. Subsequently, to separately identify the effect skills acquired through training have on a measure of employee error/bonus rate from other effects, as listed above, a further equation is estimated. Essentially the evaluation tries to isolate the systematic effects of in-house skill acquisition on worker productivity by netting out regular effects arising from other sources (age, sex, education, years of experience) and non-systematic effects arising from innate worker characteristics.

the data set

Administrative records from four months have been used. Variables include sex, measured IQ, educational attainment, age, current level of study, test scores for two subject areas of training, days since commencing work with the company, whether the worker attracted a bonus in each month owing to error-free work, casual and manager status. Test scores were not collected for all employees and about half of the data set had to be discarded. Whether or

not data on test scores are formally recorded depends on how much effort head office devotes to collecting such data. That effort appears to vary randomly so far as we can see.

the training model

The formal model of the determinants of skills acquired through in-house training (as measured by the test scores) is:

(1)

$$T_i = \alpha_0 + \alpha_1 Q_i + \alpha_2 A_i + \alpha_3 E_i + \alpha_4 ST_i + \alpha_5 C_i + \alpha_6 S_i + \alpha_7 W_i + \alpha_8 U_i + \varepsilon$$

Where T is the average of the two subject areas of training test scores. This is a proxy for the skills acquired through in-house training.

Q is measured IQ

A is age

E is educational attainment (either Years 10, 11, 12, TAFE certificate, tertiary degree)

ST is study status

C is casual/ manager status

S is sex

W is work experience as measured by the length of time since commencing work with the company

U are unobservable personal characteristics

ε is a randomly distributed (iid) error term

In principle, the coefficients (the α's) can be estimated by regression analysis. In practice, however, there is no way of measuring U and thus the coefficients on the remaining observable characteristics will be biased to the extent that they are correlated with U.

Results presented in table 23 indicate that sex, casual and managerial status and measured IQ have a significant influence on the average test score. If one abstracts from differences in casual and managerial status and measured IQ, men perform worse on the test scores than women. Similarly, both managers and casuals perform better than other employees (some employees are neither casuals nor managers). Finally a higher measured IQ is associated with higher training scores. Current level of study and age had positive but less significant effects on test scores. Staff who were currently studying and older workers had higher test results—other factors held constant. Educational attainment was not found to have an effect on scores once these above-mentioned factors were accounted for.

The overall goodness of fit of the equations is low, but this is common among cross-sectional data analysis.

The first column of coefficients represents an equation with the full set of variables. The second column excludes the educational attainment, current study status and age variables, because they exhibited a low level of significant in the first equation.

table 23: results from the training equation

	1 (t statistic)	2 (t statistic)
(constant)	-0.906	-0.284
	(-0.921)	(-5.578)
sex (0 = male, 1 = female)	0.098	0.084
	(2.383)	(2.280)
casual (1= yes, 0 = no)	0.109	0.093
	(2.067)	(2.047)
manager (1 = yes, 0 = no)	0.154	0.128
	(2.538)	(2.512)
log (measured IQ)	0.042	0.039
	(1.177)	(1.312)
educational attainment (1=year 10, 7=higher degree)	-0.006	
	(-0.265)	
study level (0=not studying, 7=higher degree)	0.010	
	(1.500)	
log (age)	0.063	
	(0.602)	
R^2	0.17	0.16

notes: Estimation method: ordinary least squares N=159
Dependent variable: log of average of training test scores

the bonus model

The primary object of this small evaluation is to determine the size of any systematic effect of the skills acquired through training, T, on the productivity of the worker, P. The formal model is:

(2)

$$P_{it} = \alpha_0 + \alpha_1 T_i + \alpha_2 Q_i + \alpha_3 A_i + \alpha_4 E_i + \alpha_5 ST_i + \alpha_6 C_i + \alpha_7 S_i + \alpha_8 W_i + \alpha_9 U_i + \upsilon_{ti}$$

Where P is the discrete productivity measure—in our case, this is the bonus rate per worker in each time period, t.

υ is a randomly distributed (iid) error term.

The bonus rate is not the best measure of productivity of the worker, and more direct measures of worker output would be preferable. However, as a measure of cost containment it reflects one of the components of total profitability.

The above model can be estimated as a random effects model. In this case, it is assumed, by appealing to the central limit theorem, that since the sample of workers is drawn from a large population, unobservable characteristics, such as unobservable ability, confidence, organisation and diligence are normally distributed. In this case, $\alpha_9 U_i$ is substituted for u_i such that $u_i \sim N(0, \sigma^2)$. The estimated equation is:

(3)

$$P_{it} = \alpha_0 + \alpha_1 T_i + \alpha_2 Q_i + \alpha_3 A_i + \alpha_4 E_i + \alpha_5 ST_i + \alpha_6 C_i + \alpha_7 S_i + \alpha_8 W_i + u_i + \upsilon_{it}$$

using a random effects panel probit model (Butler & Moffit 1982).

T is an endogenous variable and should be instrumented. However, since we were unable to derive an estimate for the training score with high R^2, we have not instrumented T. The equation is estimated as an unbalanced panel: people are only included in the sample if they were working during that month.

Ultimately, (3) seeks to establish whether there is a systematic relationship between either of the two measures of the skills acquired through training (T) and the bonus measure of productivity (P), once account has been taken of formal education, age, sex, work experience, location, time, and unobservable characteristics. The estimation technique used below tests for whether the coefficient α_1 is different from zero and how big it is.

Table 24 presents the regression results from two different version of equation (3). Rho is not significant, which indicates that unobservable individual effects are not present. The training test score (T) is significant at the ten and five per cent levels, respectively, and is positive. Length of time with the company (from commencement until the end of the month) is significant at the one per cent level. These coefficients suggest that prior length of service with the company is an important determinant of getting a bonus in any given month (given the person is in employment). This result is important and is consistent with labour economics literature which regards informal skill acquisition through learning by doing as one of the most important sources of work-related skills.

table 24: results from the bonus equation

	1 (z statistic)	2 (z statistic)
(constant)	-0.862	-7.857 (-1.676)
log (training test score)	0.928* (1.801)	0.999* (1.961)
log (measured IQ)	-0.498 (1.081)	-0.515* (-1.864)
casual (1= yes, 0 = no)	0.313 (1.066)	0.325 (1.121)
manager (1 = yes, 0 = no)	-0.429 (-1.331)	-0.425 (-1.349)
log (days since joining company)	0.182* (2.209)	0.194* (2.334)
log (age)		0.583 (1.201)
not currently studying (1=yes, 0=no)	-6.221 (-1.134)	1.043 (1.330)
currently studying at TAFE (1=yes, 0=no)	-6.279 (-1.148)	1.001 (1.254)
currently studying at university (1=yes, 0=no)	-6.268 (-1.146)	0.984 (1.244)
sex (1 = male, 0 = female)		-0.120 (0.558)
educational attainment year 11 (1=yes, 0=no)	-0.216 (-0.419)	
educational attainment apprenticeship certificate (1=yes, 0=no)	-0.116 (-0.249)	
educational attainment TAFE certificate (1=yes, 0=no)	-0.003 (-0.004)	
rho (standard error)	0.000 (0.0004)	0.000 (0.0004)

notes: Estimation method: unbalanced random effects panel probit N=203
*Significant at least at the ten per cent level
Omitted study status is currently studying for Year 12
Omitted educational attainment is Year 12

Being casual is associated with a higher bonus rate holding all other things constant (this is because casuals have less responsibility and are less likely to commit an error). Being a manager is associated with a lower bonus rate. The comparison group includes area managers.

People with higher measured IQs have a lower bonus rate once other factors are taken into account. It is likely, given that employees with a higher IQ are considerably more likely to do well at the training tests, that most of the effects of IQ are felt through the higher test scores.

Age, current study status and educational attainment were not found to be significant, and the signs of the coefficient were not robust to different equation specifications. There was a positive and significant (five per cent) correlation between measured IQ and educational attainment and study status, but the correlation coefficients were not high, being less than 0.2 in both cases. Neither month nor location was significant in any equation and results from these regressions are not presented.

There are limited diagnostics for this type of regression equation. However, the two equations increase the proportion of correctly predicted cases by about eight to five percentage points, respectively.

conclusion

Within the limitations of the given data set, there is some evidence that how well workers comprehend and remember information given to them during their induction training period is a factor in how often they commit work errors later in their time with the company. How well new staff perform in their training test procedures is also influenced by their sex (women perform significantly better than men), their measured IQs, and their manager/casual status. Holding IQ and sex constant, managers perform better than casuals, who perform better than other staff. Age, educational attainment and current study status did not appear to influence training test scores.

With respect to one measure of productivity available, the employee's chance of getting a bonus each month is directly related to his or her average training test score. The only other variable that had a consistent and significant effect on the productivity measure was the length of time since joining the company. The longer the job tenure, the more likely a person was to have worked error free in any given month, once other factors are taken into account. This result suggests that in this firm, learning by doing is an important source of productivity and work skills.

case study Y: summary

Company Y is a medium-sized firm contracting heavy earthworks, haulage and environmental services to a large mining company and its associated township in a remote part of Australia. Its main objective is to provide job opportunities and employment skills for indigenous persons rather than to make a profit. On average, the company employs around 100 people, of whom the 60 permanent full-time employees are primarily non-indigenous. Most jobs requiring technical expertise also tend to be filled by non-indigenous employees. Training had been undertaken on an 'as needs' basis, with no formal training plan or budget.

As part of a number of recent changes to improve the financial viability of the company, the newly appointed administrative services manager was given greater responsibility for training and a training officer was appointed to assist. The company faces significant barriers to recruiting, training and retaining indigenous workers. These include a lack of trainers with appropriate indigenous languages, low levels of literacy and numeracy among the indigenous workforce, a high degree of turnover and more attractive hourly pay rates available to indigenous persons through the CDEP scheme, for which the company is not eligible. The case study looks at two specific examples of recent investments in training brought on by the new management: the training of haulage workers and training associated with the introduction of a new technology in tree lopping.

For haulage workers, training was informal, with the main cost being the inefficient use of the haulage machines while the worker gained proficiency. Training was primarily on the job, and it typically took over three months for a worker to reach full proficiency. An extremely high rate of turnover of haulage operators thus meant the ongoing loss of a sizeable investment in human capital. Under the new management, this was addressed by the introduction of a rotation program to reduce fatigue, investment in new machinery and equipment to reduce breakdowns and maintenance time, improved personnel selection methods and the adaptation of training modules being used by the mining company. While the exact return on training cannot be calculated, substantial productivity gains have been achieved and the reduced turnover will now allow Company Y to make greater investments in training and reap further rewards.

An important part of Company Y's environmental maintenance operations is the lopping and trimming of trees. The standard operation involved a cherrypicker with a crew of four persons. A new technology had become available in which workers climb up and abseil down the trees using 'high angle' rescue equipment. The former management had not invested in the new technology because of the high initial training cost and high turnover. However, as the new management realised, it is a simple exercise to show that the investment is well worthwhile. The cost of adopting the new technology came to around $4000, comprising of $2300 in training costs and $1700 in the purchase of equipment. The new technology required teams of two, rather than four, to accomplish the same tasks, saving $500 in wages per day. On this alone, the cost of investment would be recouped within eight days. There is an additional saving on the hiring of the cherrypicker. It is estimated that if workers continued in the job for three months, Company Y saves $40 000 annually by using the new technology—a return on its training investment of around 500 per cent per annum!

Company Y illustrates the impact that labour turnover can have on the return to training. On the one hand, high rates of turnover reduce the incentive to invest in training. Equally, however, strategies to reduce turnover can greatly increase the returns to training, and a structured training pathway can itself form an important part of such a strategy.

introduction

Company Y is a medium-sized firm contracting heavy earthworks, haulage and environmental services to a large mining company and its associated township in a remote part of Australia. Company Y is of particular interest because it sheds light on factors influencing enterprise returns to the training of indigenous Australians as well as to the training of non-indigenous Australians in a remote location under conditions of high labour turnover.

Company Y aims not only to make a profit, but to employ as many indigenous people as possible consistent with making a profit, and to provide cost-effective training to its indigenous employees so as to raise their skills, employability and earnings. Notwithstanding the large mining company's support of Company Y's efforts to meet these objectives, achieving success had proven a difficult task in recent years. The senior management of the company had been through a number of changes over the past five years and had recently been through another change at the time of the case study.

As a result of the most recent change, a number of important business decisions had been put in place to improve the financial viability of the company, including increasing the retention of earnings in order to fund an increase in the rate of replacement of plant and equipment. This decision cut the maintenance and repair bill by 50 per cent and reduced the need to recruit and retain skilled maintenance staff. There were only eight such staff—however, turnover was low, and morale was high. Further, if a vacancy occurred, there were normally many good and locally well-known applicants to choose from. Hence, there was not a local skill shortage issue that the decision might otherwise have helped resolve.

As part of the most recent change, training had been given greater priority in the responsibilities of the newly appointed administrative services manager, and a training officer had been appointed to assist her. As is typical of many Australian companies, training was carried out on the job on an 'as needs' basis, there was no systematic recording of training done (although the certificated skills and licensed qualifications of the employees were recorded), there was no training budget as such, nor were the costs of training activities in each section of the company identified for accounting purposes. In other words, the costs of training were 'carried' by the production activities in each section, with the predictable consequence that training was essentially reactive to the inescapable needs of the sections. In this way, supervisors tried to maximise short-run production and productivity, and to minimise short-run unit production costs for the firm.

A major reason for this mindset, of course, was the day-to-day financial pressure that the firm had been under. The opportunity costs of training were thus seen as being very high. There was little scope for a longer-run investment perspective of using training to raise productivity levels in the various units sufficiently to justify the cost of the investments made by the firm in improving the skills of its employees.

To illustrate the sort of adaptation that firms often make to this sort of financial pressure, a favoured method of financing training in the company was through the use of job rotation, releasing people to jobs where they could be trained, in exchange for other people being trained in the jobs so vacated. In this way, sections giving up people for training were not compelled to run short staffed, increasing the work pressure on the remaining people if production targets were to be met within budgets.

Notwithstanding this apparently unpropitious environment for analysing the returns to training, it was possible in some specific instances to demonstrate what the returns to training were, to analyse the factors that made training economic or uneconomic, and to suggest changes that could enhance the returns to training for the firm, so that more training could be undertaken in accordance with the firm's objectives.

About 100 people were regularly employed by the company, of whom about 60 were permanent (overwhelmingly non-indigenous) full-time employees. The remainder were part time or casual workers, many employed on a daily basis. The total number employed on any

day can vary significantly (between 80 and 120) depending on the number of indigenous Australians looking for work and the requirements of the firm on any particular day.

The principal alternative employment opportunity for the indigenous population is the (work for the dole) Community Development Employment Program (CDEP) Scheme, which operates several projects in the area. Few indigenous Australians are employed in the town's businesses, government services or in the mine.

Three issues are examined in the case study:

- the returns to Company Y's investment in the training of indigenous Australians in a remote location
- the returns to Company Y's investment in the training of haulage workers in a remote location
- the returns to Company Y's investment in training associated with the introduction of a new technology in environmental services

returns to company Y's investment in the training of indigenous Australians

In 1987, Company Y employed ten full-time indigenous Australians as haulage operators. By 1999, it employed none. One indigenous Australian is employed in the maintenance workshop learning some skills on the job from a skilled tradesperson. Two more would be employed in such positions if they could be found. One indigenous Australian has a horticulture traineeship in the plant nursery. The remaining indigenous Australians are employed in the grounds maintenance section of the company largely on unskilled work maintaining the town and mine site by picking up litter, collecting garbage, mowing lawns, landscaping and gardening around the company-owned housing in the town, and controlling weeds generally.

More technical work ('special projects') involving tree lopping and trimming from cherrypickers, concrete headwall construction and bitumen laying are undertaken largely by non-indigenous Australians because of indigenous Australians' language problems, which adversely impacted the attainment of required levels of safety in these activities.

An important inhibitor in the company's efforts to train indigenous Australians for the work it can offer is the absence of sufficient skilled people who speak indigenous languages. This means that the ability of indigenous Australians to communicate in spoken, let alone written, English, and to be able to undertake computations using straightforward formulas, assumes critical importance in the company's capacity to meet its training objectives. In fact, even the brightest indigenous workers had difficulty in writing and spelling *in their own language*. Alternatives were being considered—through the use of symbols to communicate ideas and skills, for example. But the possibility of teaching advanced skills (beyond those required for whippersnipping weeds and driving vehicles) by the use of such methods seems doubtful. It was said that a minimum of Year 10 schooling was necessary in order for a person to be able to master the more advanced work skills needed by Company Y, the mine and other major employers in the town. No career progression appears to be possible for the local indigenous Australians unless they are capable in English.

Despite the cost, therefore, the company was planning to try to address the basic literacy and numeracy deficiencies of those of its indigenous employees who showed promise, as a base on which to develop more advanced skills. The local tertiary education units were also trying to teach basic literacy and numeracy to indigenous adult people. The company was forming an alliance with a university to improve the English language skills of its indigenous employees in the workplace.

Notwithstanding the recognised need for adequate competency in literacy and numeracy, it was widely believed by people in the company and in the town that the English language and numeracy skills of the indigenous community had fallen over the past ten years—and were continuing to fall. If so, the general educational environment in which the company operates

locally will need to be addressed with greater resolve by the government and the community if the company is to be able to make significant progress in meeting its training objectives beyond the most elementary level. Without such a change, the financial returns to Company Y's investment in the training of indigenous Australians in significant skills must be low.

For the company to meet its indigenous training, as well as its profit, objectives, its indigenous training activities would currently need to be heavily subsidised by the government. The most obvious way that this could come about would be to make the company eligible to receive CDEP scheme subsidies for providing employment and training to indigenous people. At present, because the company is a private company, it is not eligible for such support. This seems unduly restrictive in terms of the objectives of the CDEP scheme, although it is clear that the scheme is not intended to provide indigenous employment subsidies to businesses generally. But ringfencing this sort of application to remote areas would seem to be a relatively simple method of preventing widespread and inappropriate use of the scheme.

Even in the virtually unskilled work offered by the grounds maintenance section of the company, the company has had major difficulties attracting indigenous Australians. The company is reviewing its human resources approaches to ensure that the company's commitment to career progression for indigenous people is clearer to the people concerned, and that an indigenous-friendly working atmosphere is maintained. But a further reason for the company's difficulty in attracting indigenous Australians may well be the competition offered by local employment projects operating under the CDEP scheme. These projects offered a payment of $220 for working 20 hours in a week, or $11 per hour. However, it was said that the monitoring of actual hours spent on the job in the CDEP projects was not especially rigorous. If the actual amount of work time was ten hours in a week, say, the real hourly rate would be $22. This compares with the equivalent pay rate at the company of $278 for 20 hours' closely monitored work, or $13.90 per hour. Working at the company is also said to be 'hard work'.

Clearly, there is little incentive (if any) for indigenous Australians in the area to choose to work for the company if work on CDEP scheme projects is available.

If the CDEP subsidy were able to be used (as proposed above) to increase the company's hourly pay rate for indigenous trainees to $22, the company could pay $440 for 20 hours' work, of which $220 would be paid by CDEP and $220 by the company. The company's saving of $58 for 20 hours work could then be used to increase the pay of its trainees in years after the first year in order to reduce turnover (see below).

Twenty-two dollars an hour may seem like an extraordinary rate of pay for a trainee/unskilled position, but without a matching of the real hourly CDEP rate, it seems unlikely that the company would be able to provide attractive job and training opportunities to the indigenous community.

Turnover among Company Y's indigenous employees is very high. Some 80–90 per cent of those indigenous people who can be attracted to work for the company sever their employment connections within two years. A better articulated job and pay progression for indigenous (as well as non-indigenous) employees would reduce this. The new management is aware that the development of a career outlook and prospects for advancement are part and parcel of developing a company culture that encourages employees to remain longer with the company, enhancing the returns to investments in training by the company. (In fact, the pay for indigenous employees after ten weeks' experience has been raised since this study was undertaken from $13.90 to $17.00.)

The supervisor of the machine maintenance workshop claimed that an indigenous employee learning skills under close supervision, on the job, for a year was 35–40 per cent more productive at the end of the year than at the beginning. In principle, this rate of productivity improvement offers the basis for a viable return on company investment in training, as well as for replacing the CDEP subsidy once the training program at Company Y was complete, and for awarding attractive increases in pay for the persons being trained.

The key is to provide indigenous employees sufficient incentive to remain with the company for a reasonable period of time. In the second year of their traineeship, the indigenous trainees' pay could be raised to $498 for 20 hours, using the company's saving in wages as a result of the CDEP scheme subsidy. In the third and fourth years, as the CDEP subsidy was reduced, the company would increase its own contribution to the trainees' pay until it reached the pay rate for the skill level agreed under the Enterprise Agreement. Some residual CDEP subsidy might be necessary depending on the difference between the hourly skilled pay rate and the effective CDEP hourly pay rate. The latter rate could well be reduced by more effective monitoring of work hours in the CDEP scheme, thereby reducing the need for a continuing subsidy of indigenous employment provided by Company Y.

In summary, the returns to Company Y's investment in training of indigenous Australians in a remote location are heavily dependent on factors outside its control:

- the quality of the local indigenous schooling environment
- the application of work-for-the-dole subsidies through the CDEP scheme

At present, these factors are such that they make the company's returns to investment in such training low. Unless they are addressed, the company could only profitably invest in the training of indigenous people if heavily subsidised by the government to do so; for example, by extending the ambit of the CDEP scheme to make the company eligible for CDEP subsidies. Successful new approaches to the schooling of indigenous children would also impact very positively on the company's returns to investment in the training of indigenous Australians.

the returns to company Y's investment in the training of haulage workers

Company Y's main business was in two, connected, earthmoving operations. The first was the haulage of ore from the mine into dumps for subsequent processing. The second was the management of the processing plant's 'tailings' dump, after the ore had been processed.

Eight men were employed by rotation in these two operations, with five weeks on ore haulage and three weeks on tailings management. Training was relatively unstructured and heavily reliant on on-the-job learning under the more or less watchful gaze of a more or less supportive supervisory 'coach', the reading of operating manuals in own time, and crib-room tips from fellow workers. The cost of basic learning to use a machine (a truck, a bulldozer, an excavator or a loader) varied significantly from person to person under these conditions, but could amount to two weeks or more of lost production per machine, while proficiency (and full productivity) could take many months, depending on the complexity of the task involved. The loading task in the ore haulage operation was on the critical path for truck turn around time and, therefore, for the productivity of the whole operation. It required three months of learning for an operator to reach 80 per cent loading speed, while achieving acceptable standards of care in the management of the ore dump and the guidance of the truck fleet so as to avoid queues forming.

Prior to the introduction of the rotation scheme, turnover of licensed and certificated haulage and earthmoving operators had been very high, with the company losing about 80 per cent of its trained haulage operatives relatively soon after completing their training. The reason for this was that the men gradually became exhausted from continually meeting the testing targets agreed between the company and the mine. The returns to the company's investments in training haulage workers were greatly reduced as a result of the turnover. High turnover also undoubtedly contributed to the reluctance by supervisors to create a more structured (and therefore apparently more costly) training process.

By reducing turnover, the introduction of the rotation scheme had increased the returns to the company's investments in training haulage and earthmoving operatives, notwithstanding that rotation required an increase in training to enable the men to operate an expanded range of equipment. This initial investment in extra training was, of course, immediately costly to the company in terms of lost production and missed targets, and was understandably resisted by

some supervisors as a consequence. However, with the subsequent fall in turnover, the scheme had become accepted and entrenched as a valuable work practice.

A supportive change used by Company Y was to take more care in attempting to select new employees for these positions who were less likely to quit after being trained. These were often men who had managed to find better and more affordable accommodation. Lack of acceptable accommodation at a reasonable price was a further reason for the high turnover of labour employed by Company Y as haulage and earthmoving operatives. These men did not qualify for company-subsidised housing like the more highly skilled and senior staff of the company. Improving the availability and cost of accommodation acceptable to a more permanent set of operatives was an expensive and risky option for the company, however. It was not clear, for example, what market would exist for such housing when the mine reached the end of its life.

During and after the learning period, pay remained the same for the men. A further change that would have been supportive of a reduction in turnover would have been for the company to have negotiated a reduction in pay during the period of the men's on-the-job learning in exchange for compensating increases in pay as their skill and productivity increased. By doing so, Company Y could increase the incentive for their skilled haulage and earthmoving operatives not only to acquire their skills but also to maintain their attachment to the company. However, the company did not regard it as possible that such a provision could be agreed with its employees and written into its Enterprise Bargaining Agreement with them.

A particular opportunity for altering pay scales in this way emerges when layoffs occur (when the mine reduces its production of ore). Instead of laying the men off, they could be moved into training, at a reduced rate of pay, saving the company the loss of production that would otherwise occur if the training were carried out during regular production times, and also providing the men with more continuous employment.

At the time of the case study, production and productivity were targetted to rise by 30 per cent annually for the next two years. This rapid rate of growth was to be made possible by further investments in equipment and training, and demonstrated a shift in the company's outlook under the new management to a longer-run investment perspective of using investments in equipment, new technology and training to raise productivity levels as a means of reducing costs and increasing profitability. The new machinery and equipment not only raised productivity thresholds, owing to improved technologies, but also reduced the unavailability of the machinery and equipment for use in production because breakdowns and maintenance were less frequent. For both reasons, the returns to investment by Company Y in the training of people to use their machinery and equipment increased: the more productive trained people can be, the greater the returns to training them.

As noted earlier, the new management was also introducing improvements in the training processes by inexpensively adapting relevant training modules being used by the mining company. These improvements would improve the standard and scope of the skills attained, as well as reducing the time and cost of learning them.

In summary, the returns to Company Y's investment in training haulage workers in a remote location are heavily dependent on factors:

- affecting the turnover of its haulage workers, and
- the extent of allied investments in new equipment that raise potential productivity and reduce machine unavailability due to breakdown and down time for maintenance

By improving work conditions through its job rotation scheme, by better personnel selection, and by introducing new training methods, Company Y had been able to significantly improve the returns to its investments in training its haulage and earthmoving operatives. Some further options for reducing turnover and improving returns—such as reducing pay more during skill acquisition periods and increasing pay more after the skills have been acquired, and improving the stock of available housing—could be given renewed attention.

A striking feature of the productivity gains associated with the joint investments in physical and human capital illustrated by the haulage operatives at Company Y is that the gains are rapid and major (30 per cent per annum). This story suggests that the typical macro picture of productivity growth in the economy of one to two per cent per annum does not characterise what happens at the individual firm level, but is an average of changes going on at the firm level of much more substantial magnitudes.

the returns to company Y's investment in training associated with the introduction of a new technology in environmental services

An important part of Company Y's environmental maintenance business is the lopping and trimming of trees. The standard technology for this activity is for four persons to form a tree-trimming crew using a cherrypicker and ropes. The company employed eight people in two crews in tree lopping and trimming.

A new technology had become available for this task, involving the use of 'high angle' rescue equipment, basically requiring crew members to climb up and abseil down the trees to be lopped. This technology had not been adopted in the past because it required the outlay of about $4000 in training costs, comprising a day's wages for the eight crew (about $1000), the instructor's fee for the course (about $1000), the purchase of the new equipment (about $1700) and the cost of the staff training officer's time in organising the course (about $300). The former management's view had been that turnover was sufficiently high among the crew members that the ongoing training bill that would be required could not be justified.

This belief was almost certainly incorrect because the returns to the training program were so rapid and large. The new technology meant that two-man teams (instead of four-man teams) could accomplish the required daily task and without requiring the use of a cherrypicker. The saving in wages was about $500 per day. The cost of the course and the investment in the new equipment would be recouped in eight working days, therefore. Provided the men stayed for a fortnight after they had been trained, the company would get its money back by switching to the new technology and accepting the training costs of doing so.

Assuming that the men continued in the job for three months and that weather conditions permitted the job to be undertaken for half of the year, Company Y would save about $40 000 annually by switching to the new technology, yielding an internal rate of return of about 500 per cent per annum on annual training and equipment costs of about $8000.

Summing up, a striking feature of the returns to Company Y from a joint investment in physical and human capital resulting from the introduction of a new technology in tree lopping and trimming is, again, that the returns are rapid and major (about 500 per cent per annum). This story suggests again that the typical economy-wide picture of modest productivity growth resulting from technological advance and associated investments in physical and human capital may not be an accurate idea of the real effects of such investments in individual firms.

conclusion

The experience of Company Y illustrates the importance of labour turnover on the returns to an enterprise's investments in training. Stabilising a company's workforce in a remote and harsh environment is a difficult but potentially highly valuable company task, without which a company's choices of technologies and investments may be constrained to options yielding less profitability.

The experience of Company Y also shows the educational and labour market environment in which a company operates can exercise a strong impact on the returns to investments by the

company in the skills of its employees and, therefore, on the company's capacity to undertake such investments, even when strongly motivated to do so.

Where labour turnover had been reduced, Company Y's return on its investment in training haulage operatives was a high 30 per cent per annum; and even if turnover remained high, its investment in training its tree-trimming teams in new technology was probably near 500 per cent per annum.

case study Z: summary

Company Z is a manufacturing industry leader, producing a range of low- and high-tech products and employing over 3500 people from a diverse range of ethnic backgrounds. It has a global production and distribution network, concentrated in East and South Asia. It has a high commitment to training, with a vast array of structured courses and modules at all levels and provision for assistance for external studies. Training commitment is an important part of Company Z's ' family' philosophy to employee relations. The company is strong on supporting any self-development activities, whether work related or not, but is wary of training courses which they feel do nothing more than provide 'a piece of paper', and this includes some TAFE courses in their view.

The case study focuses on a training course the company was particularly enthusiastic about. Department E is at the cutting edge of changes in technology and customer requirements but, with high local labour costs, could not compete with the company's Asian plants in the manufacture of high-volume, standardised products. To survive, the department needed to focus on innovation and short-production-run products tailor-made to meet customer requirements. Products needed to work 'first time—every time'. The challenge was to change the culture of the department to emphasise communication, teamwork, morale and innovation in a multicultural environment in which workers were already wary of management.

A special course was developed in which groups covering nearly all of the people in the department spent two and a half days on a live-in basis at the company's special training centre in a nearby country setting. The course concentrated on developing an effective system of uninhibited communication between all levels of staff, and fostering the belief that mistakes were not attributable to an individual, but all errors belonged to the team as a whole. The teams soon realised the importance of multi-skilling and of greater awareness of the customer's requirements for the final product at all levels of the production process. Collectively the groups developed systems for problem identification, problem-solving, and continuous improvement. Repeated messages in the course were 'Why you are important'; 'The team that makes the least mistakes wins'; 'conflict leads to mistakes' etc.

While the company believes the training program has been an outstanding success, it was not practicable for it to make a rigorous quantitative assessment of the return. The estimated costs of running the courses could be put at around $150 000, comprised mainly of staff time, but definitive estimates of the returns were not available. Rather, immediately following the course, a series of projects was completed by the department to a very high standard and in quicker times than would have previously been expected. The post-training experiences indicate that productivity throughout Department E had increased by around 25 per cent. Applied to the annual labour cost bill, the increase in productivity suggests a saving of $1 200 000 annually. Even if only one-half of the increase in productivity is attributed to the training course, this still represents a four-fold pay back to the investment in just the first year.

Company Z's experience has reinforced its belief that motor skills are not the only, or maybe even the main, matter in engendering high productivity in the workplace. Attitudes, culture, communication and workers' self-belief are at least as important, and training targeted at these aspects can equally offer a very high return.

introduction

Company Z is a large, national, private company that has been in existence for more than half a century. It is a highly successful and profitable industry leader. The company currently employs more than 3500 people from 70 different national origins. It manufactures and distributes a range of low-tech and high-tech products with applications in building, communications, and consumer items. In recent years, Company Z has diversified further into printing, packaging and beverages. The company has a global production and distribution network consisting mostly of joint ventures, with a heavy concentration of activity in East and South Asia. Company Z is of particular interest because it sheds light on factors influencing enterprise returns to the training of a multicultural labour force faced by constantly evolving product requirements owing to:

- rapid technological change in electronics, including as a result of the company's own innovations
- significant changes in customer requirements from one major contract to the next

training at company Z

Company Z gives training a heavy priority in its management. Its corporate policies and procedures manual devotes 13 pages to training and development covering the identification and quantification of training needs, the implementation of suitable training courses, and the creation of career paths and promotion opportunities for the company's employees. It also provides generous external part-time study assistance, including 50 per cent of course work on paid company time and reimbursement of fees and book expenses.

The strategic plan of the human resources department is peppered with training activities. These include the following:

- improving the interviewing skills of supervisors
- implementing training programs to meet skill shortages in positions where a long-term shortage of skilled applicants is evident
- devising a training program for equal employment opportunity, discrimination and sexual harassment
- incorporating occupational health and safety competencies in all facets of company training
- training all employees in manual handling techniques
- implementing a tour guide training programme to establish a standard procedure for all the company's tour guides
- monitoring and refining apprentice training in fitting and turning, carpentry, welding, plumbing, refrigeration, electrical, graphic reproduction, printing, painting and decorating, and electronics
- providing traineeships in warehousing and logistics, plastics, quality, clerical and administration, and front line management
- expanding quality training to all departments
- provide PC training to all employees on Windows 95, Word 7, Excel, PowerPoint, internet, and e-mail
- formulating and implementing specific training plans for each department according to the departments' needs

An important aspect of Company Z's performance as an investor in the training of its workforce is the company's 'family' philosophy. Every employee is a member of the company's social club, which holds three major social functions each year for all employees—including a children's Christmas party, a ball and a picnic.

The company's 'family' philosophy extends strongly to the training area and to HRM, generally. For example, the 100 or so apprentices employed by the company receive additional training in life skills, team building and working, financial planning, public speaking, time management, continuous improvement philosophies, and management approaches and skills. Every apprentice is required to participate in an outside-directed leadership development scheme and to spend some of his or her own time in community work. In general, under the company's 'family' training philosophy, the company regards it as important, for the company, as well as for its employees, that its employees develop not only technical proficiency and skills, but also social and leadership skills.

Company Z is at pains to try to verify the skills that its employees gain through their work experience and to add appropriate additional skills through 'gap training' so as to enable the people involved to receive formal certification of their skills.

Literacy training in English had also been a special focus of the company's training activities, given its very multicultural work force. These programmes are now being wound down because of improved Commonwealth and State provision in the area.

Any training activity that has some potential spin-off benefit for the company is regarded as a candidate for company support. Employees on such 'sponsored training programmes' have their fees paid and are given at least part time off. By the same token, Company Z is suspicious of a number of courses that it regards as 'Mickey Mouse, bullshit courses that are showy and don't do anything'. A lot of TAFE is 'a piece of paper' oriented, in the company's opinion, with real knowledge transmission being in short supply. In the company's opinion, self-education is very valuable—background reading, internet, CDs, shop floor mentors and coaches, all offer far more real knowledge per hour than does a classroom environment. One might not acquire a piece of paper, but one does acquire knowledge, in the company's view. Competencies have to be detailed in a practical sort of way for them to be of value either to the trainee or the company. The company regards its basic production activities as 'agricultural'. It is strongly interested in giving people any skills that will enable them to 'do more' and to 'think outside the square', rather than simply gaining motor skills.

Company Z was particularly enthusiastic about a course it had mounted for all the people involved in Department E—a department that is at the cutting edge of changes in technology and customer requirements. The course was claimed to have changed the mind set of Department E's people, especially those on the shop floor, permitting them to make more of a contribution through problem solving, improved communication ('everyone using the same languages'), being able to work in task teams, understanding meeting procedure, and being able to deal with problems as they emerged on the shop floor.

The company felt that the course, and follow-up support in the work place, had permitted the work culture to change in a way that had significantly raised productivity, lowered costs and enabled the company to become very competitive.

This special course for Department E is the focus of the remainder of this case study. But the 'family' philosophy context that has been sketched above, together with the company's efforts to create career paths and promotion opportunities for its employees, are an important background to understanding the economics of the special course for Department E. The bottom line of Company Z's training environment is Company Z's strong internal labour market and the resulting long duration employee attachment (minimal labour turnover). Company Z's ability to create a viable and well articulated internal labour market is fundamental to understanding the successful outcomes accruing to the company's training activities, not least to the special course for the company's elite Department E.

the special course for department E

Department E faces a classic Australian manufacturing environment. Because of high Australian labour costs, Department E cannot compete with the Company Z's Asian plants in the manufacture of high volume, standardised products. However, because of low education

and training levels in Asia, the Asian plants find it difficult to respond to rapidly changing product requirements, particularly at the high-tech end of the product range.

Department E's future, if it has one, must lie in innovative, small production runs, where customers place a premium on receiving a tailor-made range of products, at the cutting edge of technology, fitting a particular specification, within a very short time frame. Furthermore, in this environment the products must work 'first time—every time', or there is a potential for very significant costs to be incurred, particularly where the products find their way into safety applications. Hence, there is a large premium attached to very high ('zero defects') quality control. The trick for Department E is to be able to earn these premia for tailor-made, cutting edge, short lead time, zero defects products, at low cost to Company Z, notwithstanding the employment of high wage Australian labour drawn from 70 different nationalities.

The method Department E used to achieve this objective was to change the productive culture in the department through a special training programme, together with follow-up changes in management and supervision, implementing the new culture and philosophy on the shop floor. The problem was not essentially to train people in better technical 'motor' skills, but to train them to communicate better, to see themselves as a team, to raise their morale and self-esteem so that quality would improve, and to increase their capacity and willingness to be flexible and to manage themselves.

required changes in work culture

The first requirement of the culture that needed to be created was to overcome the fear the shop floor people felt about the management of Department E. Many of the people were afraid to speak to the production superintendent in charge (even to say 'good morning'), notwithstanding the exceptional qualities of this person as a people manager. Many of the cultural backgrounds placed great store on hierarchy, and people with those backgrounds did not wish to expose themselves to attention from superiors. If they saw someone speaking to the superintendent in his glassed-in office off the shop floor, their cultural assumption was that that person was being told off—not holding an equal-footed discussion about a work issue, or being asked for advice, or being thanked, but being told off. They were reluctant, therefore, to tell the truth about problems—work or personal—for fear of attracting criticism and potentially losing their job. (To resolve this problem, the superintendent resorted to meeting with people in other buildings or walking round the block with them in non-production hours.)

This attitude extended to relations with other workers in Department E—it was seen as none of their business to observe what their fellow workers were doing, to note whether they were having difficulties or making mistakes or not. If someone came to help another worker, this was evidence that that worker was not coping, was making mistakes, etc. which opened up that worker for criticism and potentially the loss of their job. If 'zero defects' were to be achieved, people had to be willing to look around them to see if a problem was developing and to pitch in to help, while those being helped must not mind getting a hand every now and then. If people are struggling, they must be confident that their struggling will not be held against them, if they ask for help.

Under the arrangements put in place after the special course for Department E, the approach required to be taken universally was not to look to see who did something wrong, but to see problems, mistakes, struggling, etc. as *our* problem, not the individual's problem. Almost 100 per cent of the time this was true, of course. People do not normally want to make mistakes. They do not want to struggle or to create problems. They get into difficulties because they have not been properly trained and instructed, or because they have been given incorrect or modified parts to assemble or been given the wrong equipment or the wrong procedure, or been put under too much pressure.

This approach can be contrasted with previous approaches to involve the shop floor in dealing with problems. Basically, the departmental management would ask the shop floor to hold 'gripe' sessions among themselves (with no management present—ironically implicitly

underscoring that the culture was in fact one of 'us' and 'them') and to send a spokesperson to report back to management on problems that were of 'anonymous' origins. Management then fixed the problems, some being so obviously ones that the management would like to see fixed that the question had to be: 'Why wouldn't you tell us?'

Until the course, the shop floor employees were reluctant to contribute because they felt inferior and/or that they would be told off if they bothered someone with their problem. Since the course they have felt free to talk to the engineers, storemen (about parts—'they don't look right'), etc. Team leaders (usually leading hands) now guide the shop floor people where to get the information that they want. After the course, 12 task teams were formed. Each team is made up of shop floor employees, technicians, clerical workers, engineers, purchasing officers, storemen, and so on.

The idea behind this structure is to demonstrate that every person is employed in Department E to do a job, that everyone is special and has different experiences to contribute to help Department E to do better. The team is designed to break down the idea that the people are simply cogs in a machine, and to encourage them to talk to each other, to identify issues that are of concern to team members, and to fix their problems for themselves among themselves. The teams are encouraged to talk to management only to fix things that they can not fix among themselves. No limitations have been placed on the time and resources that the teams are allowed to use to problem solve and 'fix things'.

One of the first issues identified by the teams, interestingly enough, which standard management approaches might well have ignored as being trivial, was inadequate shop floor knowledge about the products that they were producing—who uses each product? what does it do? and so on. Armed with this knowledge, the team members were able to work faster and more confidently, making fewer mistakes, knowing what the devices actually meant that they were creating, why they were like they were—and had to be that way.

The productive result of this change in culture has been a capacity to introduce new products more rapidly because the people are able to sort out the problems better and faster among themselves rather than wait in a state of confused and slow communications for management to 'fix it'. The rate of rejects and 'stuff ups' has fallen. People learned that others in their team had similar problems to those that they faced. This bred sympathy and understanding of why things sometimes did not go smoothly around them despite other people doing their best. Spontaneous staff meetings reviewed work scheduling and staff allocations across sections in light of the work pressures and staff shortages and other problems of the day. Arrangements would be put in place by the team leaders so that experienced workers sat with the inexperienced 'reallocated' workers to help the latter rapidly learn their job. These 'coaches' were required to keep an eye on things and to check how things were going at regular intervals. The work teams rapidly identified the need for multiskilling, therefore, as a high priority issue to be addressed. People attempted not to add more pressures to areas identified as being 'busy' or overloaded at a particular moment.

There was a language problem as well, which Company Z also addressed, but this problem was far less significant in affecting productivity than the fear of admitting difficulties, admitting failures to understand, and admitting mistakes. Without addressing that fear, the chances of achieving 'zero defects' were remote. The first requirement was to insist that people care about the quality of their work and at the same time to build their trust in their work environment not to punish them for mistakes.

Another way of coping with the quality problem would be to inspect and test every item produced, but this was not only very costly but far from failsafe, since some faulty assemblies might only show up some time after installation and initial use.

special course content

The special course was organised in seven groups of people covering nearly all of the people in Department E, initially on a volunteer basis. Each course took two and a half days from

Thursday morning to Saturday lunchtime on a live-in basis at the company's special training centre located in a nearby country setting. Fourteen hours of the course were on company time and eight hours were on the employees' time. The objectives of the course were to:

- determine and develop a system of effective and uninhibited communications amongst all levels of staff in Department E in relation to needs, wants and ideas
- determine and agree on a system of problem solving
- identify a sample of particular problems that currently needed addressing and determine appropriate courses of corrective action
- define continuous improvement practices and identify appropriate areas where those practices could be applied and determine plans that would enable those practices to be carried out

The foreseen benefits of the program were to reach initial required levels of effectiveness in:

- communications
- flexibility
- motivation
- quality approach
- teamworking

Repeated messages in the course were 'Why you are important'; 'Why it is important to do things right'; 'The team that makes the least mistakes wins'; 'Conflict leads to mistakes'; 'Be unselfish to be a winner'; and so on.

Of particular interest is the emphasis placed in the course on the idea of quality being an outcome of motivation, defined as 'genuine enthusiasm about doing the work required and doing it well'. For a person to carry out a task efficiently, it was argued, 'they must want to do it and they must know that they are able to do it'.

the special course's costs and returns to the company

The costs to the company of each course were 14 hours of paid lost production for each participant at the company's internal charge-out rate of $14.70 per hour times 20 participants per course, plus a $6000 facility charge for each course, plus an (assumed) internal charge-out rate of $500 per day (assumed to be for three days, including preparation time) for each of the four live-in course presenters from Company Z, plus a $2000 facilitator's fee per course. Hence, the cost to the company for each course was about $22 000. There were seven courses held in all, so that the total cost of the training program to Company Z was about $154 000. (In addition, there were costs carried by the employees—eight hours of sacrificed own time. The company also received significant offsetting government subsidies, but we shall ignore those in order to see whether the investment would have been justifiable without subsidy.)

Was this investment in training by the company of about $150 000 economically justified? Did the training programme earn the company an adequate return?

Although the relevant data for answering this question reasonably accurately could be compiled from company records of Department E's productivity before and after the course, to do so would have been costly to Company Z and Department E, and this possibility was not pursued. Instead, the rather clinical judgement of Department E's production superintendent was used in a review of Department E's performance in three major community-facility fit outs that Department E undertook after the course had been completed. Each of these projects required 'impossible' delivery times for a range of tailor-made products, including a number of high-tech devices that had to be designed from scratch.

The first of these projects had to be completed within one month from product conception and design to delivery. The department had ongoing production commitments to meet at the same time. The task involved doubling production overnight, which posed huge problems, even

with the recall of former employees on the department's casual call-up roster. Methods of working the equipment round the clock were proposed by the shop floor and adopted by Department E's management. To meet the deadline required a team of people to volunteer to work in shifts 24 hours a day seven days a week. Quality had, nevertheless, to meet a 'zero defects' standard because of the potentially significant risks and dangers that could follow from the installation of defective devices. Without the improved method of working, the extra trust, motivation and co-operation, resulting from the course, the production superintendent of Department E believes that Department E would have missed the deadline by about one week. In other words, the productivity improvement associated with the course (and follow-up actions, of course) was about 25 per cent.

The second project, involving different and more complex criteria, different concepts and a completely redesigned product from scratch, but for a similar public facility, had to be completed in six weeks. Because of the experience gained in the first project, production was even faster and the deadline was more easily met, confirming a view of about a 25 per cent gain in productivity from the new methods of working.

The third project was just under way at the time of the case study, involving a major fit out of new products in a different public use, and facing problems from a required interfacing with other suppliers that were not as 'up to speed' in meeting these sorts of demands as Department E was. Department E was now confident it could successfully complete the project profitably, on time and at the required quality standards, in light of its experience in the two earlier jobs, working in its newfound way.

Further confirmation of the estimate of the gain in productivity associated with the special course comes from Department E's production growth (over a three-month period under the new system) from $1.2 million per month to $1.5 million per month, with only about a ten per cent increase in labour hours, while producing a more complex and rapidly changing product mix. This mix now involves prototype production, trial products for testing, and a large raft of completely new products for Department E's normal markets.

Assuming 40 weeks of actual production by a full-time employee (allowing for vacations, public holidays, sick leave and other absences), 40 hours work per week worked, an average $15 charge-out rate per hour worked, and 200 employees in Department E, Department E's annual labour cost bill would be about $4 800 000. A productivity gain of 25 per cent is worth about $1 200 000 annually, therefore. This is a huge gain relative to the $150 000 cost of the special course, even if only a fraction of the gain is attributable directly to the course, and the remainder is attributed to allied changes of one sort or another. If half of the gain is attributed to the course and half to other factors, the one-year rate of return is about 500 per cent. Another way of looking at this is to note that it implies a pay-back for the course of about $24 000 per week and a pay-back period of less than six weeks for the company's investment in training its employees in improved methods of working.

conclusion

The experience of Company Z illustrates the value in terms of enhancing company returns from investments in training, of HRM policies that enhance commitment to the company and reduce labour turnover. The 'family' philosophy, together with successful efforts at creating an effective internal labour market, have permitted Company Z to place great emphasis on the training of its employees as a key part of its business strategy. This record of low turnover is despite the company being in the manufacturing sector and drawing on a multicultural group of people for its employees.

The commitment of the company to broadening the skills of its apprentices and other employees beyond the normal motor skill acquisition curriculum into the gaining of leadership and social skills, life skills, team building and working, financial planning, public speaking, time management, and other management approaches and skills is also notable. Clearly, Company Z intends its training to equip its people to become effective leaders and managers in due course. This is a long run perspective that shows Company Z's hope and

confidence in the probability of its employees staying with the company for a significant period of time.

Another important dimension of Company Z's training philosophy is the high value it places on informal learning on and off the job, rather than formal training in 'classrooms'. This is a theme that permeates the results of the various approaches we have explored towards evaluating the returns to an investment in training by enterprises in Australia. The emphasis given by government policy to formal training in Australia may well be inappropriate from a business perspective, therefore.

The training program mounted by Company Z to change the work culture in Department E, so as to reduce fear, create teamwork and raise morale, confidence and enthusiasm, as an approach to raising quality and productivity, is particularly interesting. The program again shows that the company believes that motor skills are not the only, or maybe even the main, matter in engendering high productivity in the work place. Attitudes, culture and communication are at least as important. That Company Z was willing to invest in training to bring about such a productive culture speaks volumes for the quality of the company's management. The returns to this investment by the company are, quite clearly, very high.

conclusions and recommendations

outcomes and findings from the research designs

Here, we reproduce the main findings that have emerged from the approaches taken to exploring the issue of enterprise returns to an investment in training in the Australian context.

1. Australian firms provide extensive training for their incoming employees. About half of the time of incoming employees is taken up with training over the first three months of their employment, compared with about a third of the time of incoming employees in USA firms. The main sources of this difference are the greater hours spent in Australia on formal training off the job and on informal training provided on the job by co-workers.
2. This result is associated with Australian workers paying more for their training (through accepting lower starting wages) than happens in the USA, and with employers gaining productivity increases from this training (not offset by employees' wage increases) of about two-thirds of those in the USA. In fact, nearly all the productivity gains from incoming employees' training were captured by firms in Australia, compared with about half of the productivity gains in the USA. The combination of these two factors means that employer-sponsored training is probably about as profitable to Australian firms as it is to USA firms.
3. Prior education and training *increases* the likelihood, in Australia, that an employee will receive further training opportunities, but reduces the number of *extra* hours that an employee actually spends on further training. This implies that Australian firms are at least somewhat effective in their selection processes in matching trainable people to jobs requiring training.
4. Hours (quantity) of training given by Australian firms are directly related to product-market uncertainty and unpredictability, and to other forms of capital investment in innovation, physical capital and R&D. Quantity of training is also inversely related to involuntary labour turnover. Types (quality) of training given by Australian firms are directly related to the presence of internal labour markets in firms, as well as to other forms of capital investment by firms and competitive product market conditions.
5. The profitability of firms is directly related to the quantity and quality of training provided by them and is also reflected in firms' paying above market wage rates and in difficulties in their finding suitable employees.
6. The results reported in the two preceding paragraphs appear to be largely consistent with British results using the same survey instrument.
7. By contrast, preliminary results from the study of matched hotels, unlike results from the work of Prais on matched hotels at NIESR in Britain, reveal little influence of training practices or VET qualifications on productivity levels in the hotels studied. Commitment to training in the majority of hotels studied is poor, and reactive rather than proactive. However, these results may be confounded by an inability to maintain a constant star rating across the sample of hotels investigated.
8. The preliminary review of the experiences revealed by case studies of three firms shows that enterprise returns to training can be exceptionally high, especially for training that is highly specific, rapidly accomplished, and related to the introduction of new technology or working patterns. Such training pays a firm, even if labour turnover is high.
   - For example, Company X has a labour-intensive production process. A formal induction period of five days is offered to all production line workers. The employee's chances of getting a productivity bonus each month turns out to be directly related to his or her average training test score. The only other variable that has a consistent and

significant effect on the chances of getting a productivity bonus is the length of time on the job, which suggests that learning by doing is an important source of work skills and productivity.

- Company Y introduced a new production technology involving the adaptation of high-angle rescue equipment for a tree lopping and trimming activity. The training occupied one day. It paid for itself in a fortnight. The rate of return to the company on its investment in training exceeds 500 per cent per annum. Learning on the job is Company Y's preferred method of investing in skill acquisition by its employees.
- Company Z changed its work culture in a particular department through an intensive training activity involving all of the staff in the department over a series of weekends. The results have been a 25 per cent increase in productivity, and a rate of return to the company on its investment in training in excess of 500 per cent per annum.

9. Informal learning and training methods, on and off the job, were regarded by many of the businesses as generally superior to formal classroom training because *real* knowledge was learned in the former, while the latter was too often mostly about obtaining paper qualifications. Further, some of the most important skills from businesses' point of view were communication skills, team-working skills and leadership skills—not just task-oriented, motor skills.

conclusions

The overall results emerging from the various research approaches attempted in the course of this study are suggestive of a positive impact from investments in training by enterprises on the productivity and profitability of firms in Australia.

Nevertheless, to be truly convincing, the pilot surveys and case studies undertaken in this study would need to be replicated with significantly larger samples, if the conclusions were to be based on a sound statistical footing. The conclusions are important, in a policy sense, particularly in the context of the debate that has recently emerged about reasons for the weakness of the Australian dollar relative to the USA dollar.

It is important to note, in this respect, that the ABS is planning to drop its training expenditure and training practices surveys. In other words, data that presently are being collected that could have been augmented to enable the assessment of the productivity and profitability investments in training by enterprises are no longer going to be. Official data collection about training at the enterprise level is about to become worse, not better.

recommendations

We would strongly recommend that the Commonwealth Government:

- either reverse this decision and reinstate these surveys, amended on the basis of the EOPP and CEP surveys trialled in this study, or, that it
- fund a new large-scale enterprise level training survey, based on the EOPP and CEP surveys trialled in this study, preferably in a longitudinal data context, perhaps attached to the present Business Longitudinal Survey, to provide a solid quantitative basis for assessing the returns to training by enterprises in the Australian context. Such information is crucial to providing a proper basis for considering policy towards enterprise level training.

We would also strongly recommend that case studies continue to be undertaken by NCVER and other training research bodies using the framework developed by OTFE (1997) to provide a steadily increasing body of evidence on the productivity and profitability of individual firms' training experiences.

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The National Centre for Vocational Education Research is Australia's primary research and development organisation in the field of vocational education and training.

This is the second of a series of publications that specifically study the financial benefits to industry of investing in training.

Other titles are *Analysing enterprise returns on training* by Moy and McDonald, *Enterprise return on a training investment* by Doucouliagos and Sgro, also *Training for productivity* by Maglen, Hopkins and Burke.

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